

SONY®

CAMERA CONTROL UNIT

CCU-550

CCU-550P

MAINTENANCE MANUAL

Volume 1 1st Edition (Revised 1)

Serial No. 10001 and Higher (UC)

Serial No. 40001 and Higher (CE)

警告

このマニュアルは、サービス専用です。

お客様が、このマニュアルに記載された設置や保守、点検、修理など行くと感電や火災、人身事故につながる可能性があります。

危険をさけるため、サービストレーニングを受けた技術者のみご使用ください。

WARNING

This manual is intended for qualified service personnel only.

To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.

Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegebenen Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

AVERTISSEMENT

Ce manuel est destiné uniquement aux personnes compétentes en charge de l'entretien. Afin de réduire les risques de décharge électrique, d'incendie ou de blessure n'effectuer que les réparations indiquées dans le mode d'emploi à moins d'être qualifié pour en effectuer d'autres. Pour toute réparation faire appel à une personne compétente uniquement.

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.
Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

Vorsicht!

Explosionsgefahr bei unsachgemäßem Austausch der Batterie.

Ersatz nur durch denselben oder einen vom Hersteller empfohlenen ähnlichen Typ.
Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

ADVARSEL!

Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.

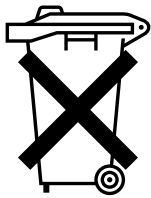
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

Voor de klanten in Nederland

Dit apparaat bevat een MnO₂-Li batterij voor memory back-up.

Raadpleeg uw leverancier over de verwijdering van de batterij op het moment dat u het apparaat bij einde levensduur afdankt.

Gooi de batterij niet weg, maar lever hem in als KCA.



Bij dit produkt zijn batterijen geleverd. Wanneer deze leeg zijn, moet u ze niet weggooien maar inleveren als KCA.

Attention-when the product is installed in Rack:

1. Prevention against overloading of branch circuit

When this product is installed in a rack and is supplied power from an outlet on the rack, please make sure that the rack does not overload the supply circuit.

2. Providing protective earth

When this product is installed in a rack and is supplied power from an outlet on the rack, please confirm that the outlet is provided with a suitable protective earth connection.

3. Internal air ambient temperature of the rack

When this product is installed in a rack, please make sure that the internal air ambient temperature of the rack is within the specified limit of this product.

4. Prevention against achieving hazardous condition due to uneven mechanical loading

When this product is installed in a rack, please make sure that the rack does not achieve hazardous condition due to uneven mechanical loading.

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Manual Structure

Purpose of this manual

This manual is the maintenance manual for Camera Control Unit CCU-550/550P. This manual describes the information items necessary when the unit is supplied and installed, items on maintenance, and items that premise the service based on the components parts such as schematic diagrams, board layouts and spare parts list, assuming use of system and service engineers.

Contents

The followings are summaries of the each section for understanding the manual.

Maintenance Manual Volume 1

Section 1. Installation

Describes information about connector input/output signals, instance of configuration and function of internal switches.

Section 2. Service Overview

Describes information about replacement of part and self-diagnosis mode.

Section 3. Electrical Alignment

Describes electrical adjustment procedures.

Maintenance Manual Volume 2

Section 1. Spare Parts

Describes parts list, exploded view, supplied accessories and fixtures list used in the unit.

Section 2. Semiconductor Pin Assignments

Describes function diagrams and pin names of semiconductor used in the unit.

Section 3. Block Diagrams

Describes overall block diagram and the block diagrams for every circuit board.

Section 4. Board Layouts

Describes board layouts for every circuit board.

Section 5. Schematic Diagrams

Describes schematic diagrams for every circuit board.

Relative manual

Besides this maintenance manual, the following manual is available for the unit.

- **Operation Manual(Supplied with the unit)**

This manual is necessary for application and operation of the unit.

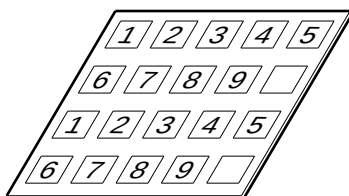


Section 1

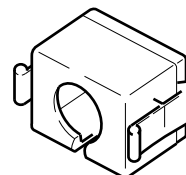
Installation

1-1. Supplied Accessories

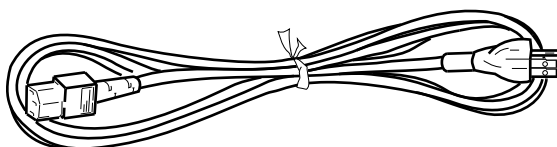
- Remote indicator: 1pc (Sony part No.: A-8278-054-A)



- Plug holder: 1pc
for CCU-550 (Sony part No.: 2-990-242-01)
for CCU-550P (Sony part No.: 3-170-078-01)



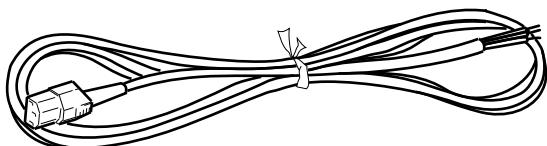
- Power cord: 1pc for CCU-550
(Sony part No.: 1-551-812-11)



With 3P-plug
Length: about 2.7 m
Rated voltage: 125 V
Rated current: 10 A

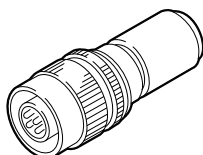
- Operation Manual: 1pc
- Maintenance Manual Volumes 1 and 2: One each

- Power cord: 1pc for CCU-550P
(Sony part No.: 1-590-910-11)



Without plug
Length: about 2.5 m
Rated voltage: 240 V
Rated current: 10 A

- Plug (4P): 1pc (Sony part No.: 1-560-343-11)



1-2. Adaptive Connectors and Cables

1-2-1. Connector Input/Output Signals

The connector input/output signals are described below.

Rear panel

[Input signals]

- REFERENCE (BNC) 40 IRE(300 mV p-p), VBS, burst sync, loop through
- RET (BNC × three systems) 140 IRE(1.0 V p-p), VBS, or VS, loop through
- PROMPTER (BNC) 140 IRE(1.0 V p-p), VBS, or VS, loop through

PROMPTER/RET3(Selectable by S1001 on the DM board.)

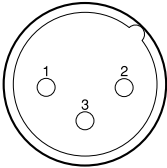
[Output signals]

- R (BNC) 700 mV p-p
- G (BNC) 700 mV p-p
- B (BNC) 700 mV p-p
- Y (BNC) 100 IRE, 40 IRE (sync) (for CCU-550)
700 mV p-p, 300 mV p-p (sync) (for CCU-550P)
- R-Y (BNC) 700 mV p-p (75% color bars) (for CCU-550)
525 mV p-p (75% color bars) (for CCU-550P)
- B-Y (BNC) 700 mV p-p (75% color bars) (for CCU-550)
525 mV p-p(75% color bars) (for CCU-550P)
- WF (BNC) 100 IRE/140 IRE (ENC) (for CCU-550)
700 mV p-p/1.0 V p-p (ENC) (for CCU-550P)
- PIX (BNC) 140 IRE(1.0 V p-p)
- VBS (BNC × three systems) 140 IRE(1.0 V p-p)
- SYNC (BNC) 300 mV p-p
- SERIAL OUTPUT (BNC × two systems) (when BKP-5972 is connected)
D1 format serial digital,
SMPTE 259M/ITU-R BT-656
Y/G, R-Y/R, B-Y/B selection (Selectable by S401 on the VA board.)

[Input/output signals]

- TRIAX King type (for CCU-550)
Fischer type (for CCU-550P)
- COAX (BNC) (Refer to section 1-6. DM Connector Setting.)

MIC OUTPUT CH1/CH2(XLR 3P, MALE)



(EXTERNAL VIEW)

(0 dBu = 0.775 Vrms)

No.	Signal	Specifications
1	MIC OUT (G)	0 dBu/−20 dBu
2	MIC OUT (Y)	(Selectable with S201,
3	MIC OUT (X)	S251/AU board)

WF MODE(4P FEMALE)

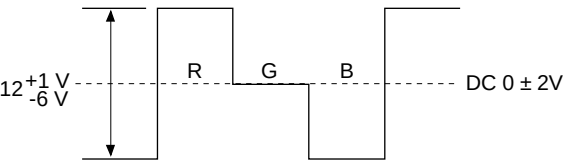


(EXTERNAL VIEW)

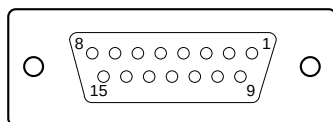
(0 dBu = 0.775 Vrms)

No.	Signal	Specifications
1	SEQ CONT OUT (G)	OPEN COLLECTOR +(PNP)/−(NPN)
2	SEQ CONT OUT (X)	(Selectable with S901/VA board)
3	STAIR CASE OUT (X)	*1)
4	STAIR CASE OUT (G)	GND for STAIR CASE

*1) Stair Case signal



MIC REMOTE(D-Sub 15P, FEMALE)



(EXTERNAL VIEW)

(0 dBu = 0.775 Vrms)

No.	Signal	Specifications
1	+5.5 V OUT	Max. 200 mA
2	AUX4 (*4 TALLY GND)	(*4 TALLY for GND)
3	AUX2 (*4 G TALLY OUT)	(*4 Q405 (NPN) /AT board ON (GND):Max 30 mA
4	AUX1 (*4 R TALLY OUT)	(*4 Q403 (NPN) /AT board ON (GND):Max 30 mA
5	CHU MIC	*2) See below
6	AMP	
7	GAIN IN	
8	MIC1 GAIN CONT ON/OFF IN	*3) See below
9	GND (+5.5 V)	GND for +5.5 V
10	AUX3 (*4 TALLY OUT)	(*4 R/G TALLY OUT Q409 (NPN) /AT board ON (GND):Max 30 mA
11	NC	No connection
12	AUX11	
13	AUX10	
14	AUX9	
15	MIC GAIN CONT2 IN	*2) See below

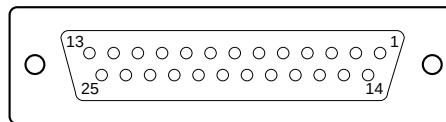
*2)

CONT0	CONT1	CONT2	CHU MIC1 AMP GAIN
H	H	H	60 dB
L	H	H	50 dB
H	L	H	40 dB
L	L	H	30 dB
H	H	L	20 dB

*3)

8pin	15pin	MIC GAIN CONT
L	L	MIC1/MIC2 ON
L	H	MIC1 ON
H	L	MIC2 ON
H	H	INTERNAL SET

INTERCOM/TALLY/PGM(D-Sub 25P, FEMALE)



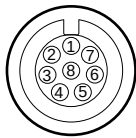
(EXTERNAL VIEW)

(0 dBu = 0.775 Vrms)

No.	Signal	Specifications
1	ENG (R) (X) OUT	ENG SYSTEM RECEIVE
2	ENG (R) (Y) OUT	0 dBu BALANCED
3	ENG (G)	GND for ENG
4	ENG (T) (X) IN	ENG SYSTEM TALK
5	ENG (T) (Y) IN	0 dBu BALANCED
6	PGM (X) IN	-20 dBu/0 dBu
7	PGM (Y) IN	(Selectable with
8	PGM (G) IN	S451/AU board)
9	GND	GND for AUX
10	AUX8	
11	R TALLY (X) IN	ON: 24 Vdc, TTL (H), SHORT
12	R TALLY (Y) IN	OFF: 0 Vdc, TTL (L), OPEN
13	GND	CHASSIS GND
14	PROD (R) (X) OUT	PROD SYSTEM
15	PROD (R) (Y) OUT	RECEIVE 0 dBu BALANCED
16	PROD (G)	GND for PROD
17	PROD (T) (X) IN	PROD SYSTEM TALK
18	PROD (T) (Y) IN	0 dBu BALANCED
19	NC	No connection
20	NC	No connection
21	NC	No connection
22	AUX7	
23	AUX6	
24	G TALLY (X) IN	ON: 24 Vdc, TTL (H), SHORT
25	G TALLY (Y) IN	OFF: 0 Vdc, TTL (L), OPEN

*4 To use these interface signals, modification for AT board is required.
For more details, please consult your Sony service representative.

REMOTE(8P, FEMALE)
RCP/CNU

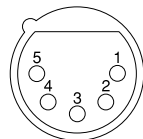


(EXTERNAL VIEW)

No.	Signal	Specifications
1	TX (+)	CCU SERIAL DATA
2	TX (−)	
3	RX (+)	RCP/CNU/BVP/MSU/VCS
4	RX (−)	SERIAL DATA
5	TX GND	GND for TX
6	POWER (+) OUT	RCP POWER 30 V
7	POWER (−) OUT	GND for POWER
8	SPARE	
	CHASSIS GND	CHASSIS GND

Front panel

INTERCOM(5P, FEMALE)



(EXTERNAL VIEW)

(0 dBu = 0.775 Vrms)

No.	Signal	Specifications
1	INCOM (T) IN (Y)	−20 dBu (CARBON MIC)
2	INCOM (T) IN (X)	−60 dBu (DYNAMIC MIC)
3	INCOM (T) IN (G)	GND for INCOM
4	INCOM (R) OUT (X)	Max. 12 dBu
5	PGM OUT (X)	Max. 12 dBu

1-2-2. Connection Connector

Use the connectors below or the equivalent at its tip when cables are connected to each connector on the connector panel during installation and servicing.

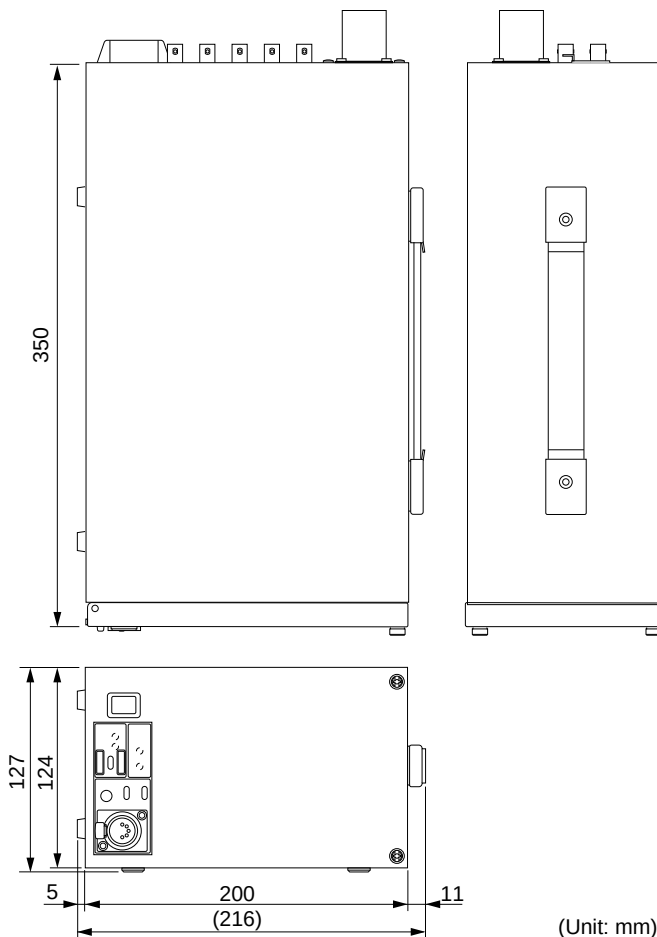
Connector name	Connected connector/cable
REFERENCE RET 1/2/3 PROMPTER R/G/B Y/R-Y/B-Y WF PIX VBS 1/2/3 SERIAL OUTPUT COAX (BNC type)	1-560-069-11 plug, BNC, or B-B cable assembly (1.5 m in cable length, optional)
MIC OUTPUT CH1/CH2 (3P, MALE)	1-508-083-00 XLR, 3-pin FEMALE or CANNON XLR-3-11C or the equivalent
MIC REMOTE (15P, FEMALE)	1-506-582-11 D-Sub,15P MALE 15-pin male, or JAE DA-15PF-N or the equivalent
INTERCOM/TALLY/PGM (25P, FEMALE)	D-Sub, 25-pin male, JAE DA- 25PF-N or the equivalent
WF MODE (4P, FEMALE)	1-506-155-00 plug, 4-pin male (supplied)
REMOTE (8P, FEMALE)	1-766-848-11 plug, 8-pin male, or CCA cable assembly (optional) CCA-5-10(10 m) CCA-5-3(3 m)
INCOM (5P, FEMALE)	1-508-370-11 XLR, 5-pin male, or CANNON XLR-5-12C or the equivalent

1-3. Operating Environment

Operating temperature: -10°C to $+40^{\circ}\text{C}$
Storage temperature: -20°C to $+50^{\circ}\text{C}$
Humidity: Noncondensing
Supply voltage: 100 V to 240 V $\pm$ 10% (50/60 Hz)
Power consumption: 100 W (maximum)

1. Do not put the unit in a place subject to high temperature or in a location near heat sources.
2. Do not put the unit in a place subject to excessive electric and magnetic fields.
3. Put the unit in a dry and well-ventilated place.
4. Do not put the unit in a place subject to excessive dust and mechanical shock.
5. Do not put the unit in a place subject to direct sunlight and light.

Outer dimensions

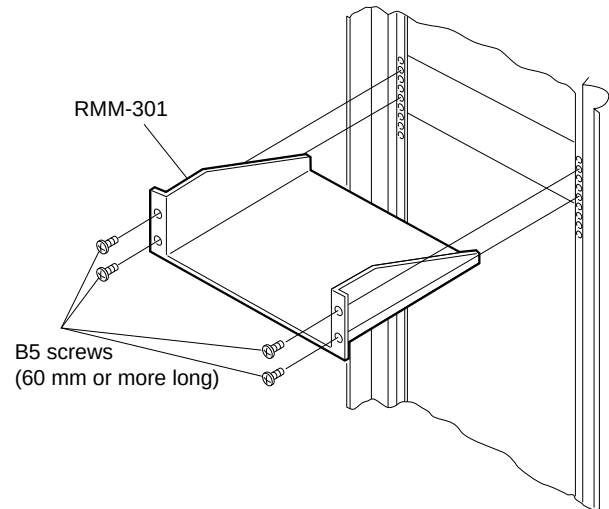


1-4. Mounting on 19-Inch Rack

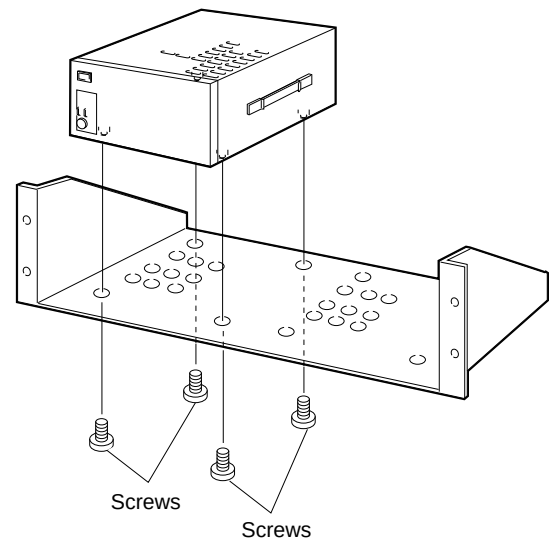
Two CCU-550s can be mounted on a 19-inch EIA standard rack in parallel by using rack mount adaptor RMM-301 (optional).

Mounting

1. Tighten the four rack mount screws.

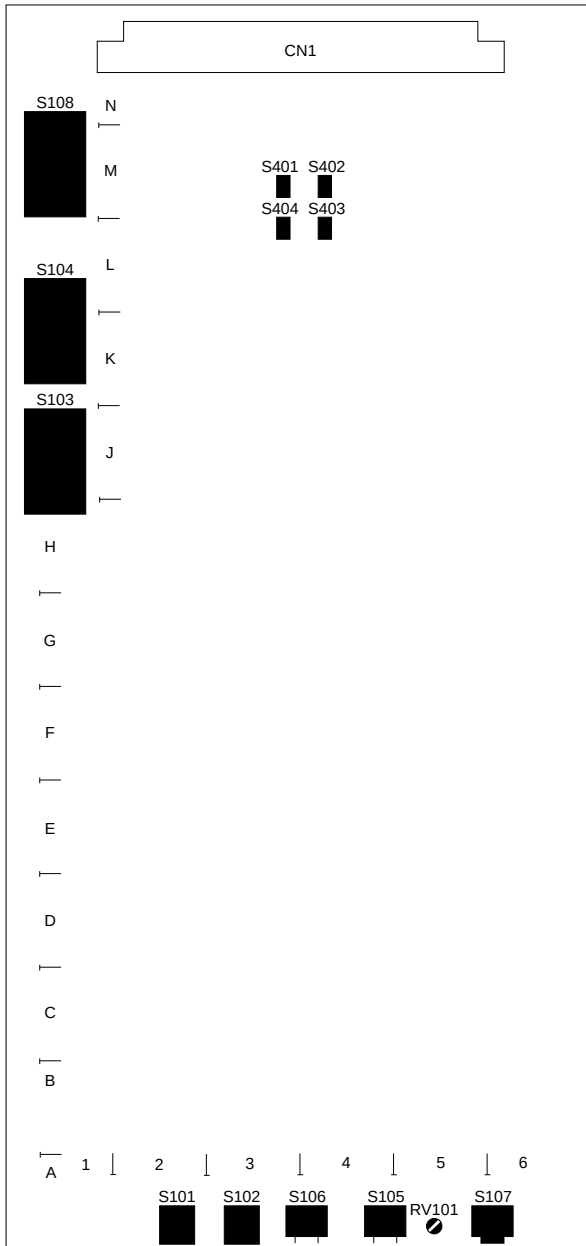


2. Mount the CCU-550 on the rack mount adaptor as shown in the figure below and tighten the four fixing screws (supplied for RMM-301).



1-5. Functions of Switches on Board

AT-111 board



- S101 (MIC 1, GAIN)
- S102 (MIC 2, GAIN)

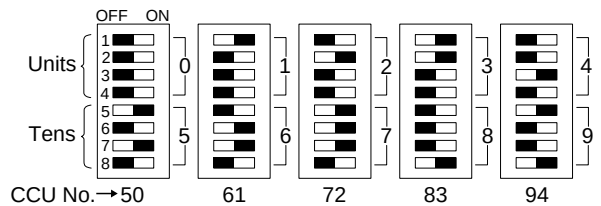
These switches are used to select the MIC 1/2 amplifier gain of the camera head by this unit. The gain is set to 60 dBu (NORM), 50 dBu, 40 dBu, 30 dBu, or 20 dBu (MIN) according to the microphone sensitivity and volume condition during shooting.

Factory setting: [NORM](60 dBu)(0 dBu = 0.775 Vrms)

- S103 (CCU No.)

This switch is mainly used to set the CCU number. The CCU number of 1 to 96 can be set in binary coded decimal (BCD) using switches 1 to 8 of S103. The switches 1 to 4 determine the number of units and 5 to 8 determine the number of tens. For each digit, the number of 0 to f can be assigned. However, the number of a to f becomes invalid.

(Example)



Factory setting: All OFF

- S104-1

Not used.

Factory setting: OFF

S104-2 (EXT REF LOCK CAUTION ON/OFF)

When no reference signal is input to CCU, alarm indicator is lit or alarm message is displayed on MSU, RCP or CNU normally. This switch selects whether the alarm indication is performed with no reference signal input, or not.

With the switch set to ON, the alarm indication is not performed.

Factory setting: OFF

S104-3

This switch sets the output signal of the CCU when the camera power is turned off.

ON: Color bars signal output

OFF: Muting

Factory setting: OFF

S104-4

This switch sets the control system of PIX and WF connector outputs.

ON: Controls the PIX and WF by MSU only.

OFF: Controls the PIX and WF simultaneously by MSU or RCP.

Factory setting: OFF

S104-5 Unused

S104-6 Unused

S104-7 Unused

Factory setting: OFF

S104-8 (CONTROL CLEAR)

When the CCU power is turned on with this switch set to ON, all analog control data is returned to the center value, and the switch data is returned to the factory-setting value.

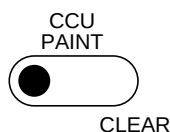
Note

- This switch setting is valid only when the CCU number set by S103 is less than 96.
- When switches 1 to 8 of S103 are all set to ON with S104-8 set to ON, the hour meter data memorized in the microcomputer on the AT board is reset.
- When switches 2 to 8 of S103 are set to ON with S104-8 set to ON, the character signal set by the user is erased.

Factory setting: OFF

- **S106 (CCU PAINT CLEAR)**

The control item that can be changed in the CCU is fixed to the center value when this switch is set to CLEAR.



- S401 (R TALLY POWER/CONTACT)
- S404 (R TALLY POWER/TTL)

These switches are set according to the signal standard of the R TALLY signal input to the INTERCOM/TALLY/PGM connector on the rear panel. For the relation between the signal and switch setting, refer to the table below.

Factory setting: POWER

- S402 (G TALLY POWER/CONTACT)

- **S403 (G TALLY POWER/TTL)**

These switches are set according to the signal standard of the G TALLY signal input to the INTERCOM/TALLY/PGM connector on the rear panel. For the relation between the signal and switch setting, refer to the table below.

Factory setting: POWER

Switch	Signal name		
	Contact	Power(+24 V)	TTL
S401, S402 (Power/Contact)	Contact	Power	Power
S404, S403 (Power/TTL)	Power or TTL	Power	TTL

- **S105 (BUZZER)**

This switch is set to OFF when no buzzer is used.

Factory setting: OFF

- **RV101 (BUZZER VOLUME)**

This switch is used to adjust the buzzer volume.

Factory setting: MAX

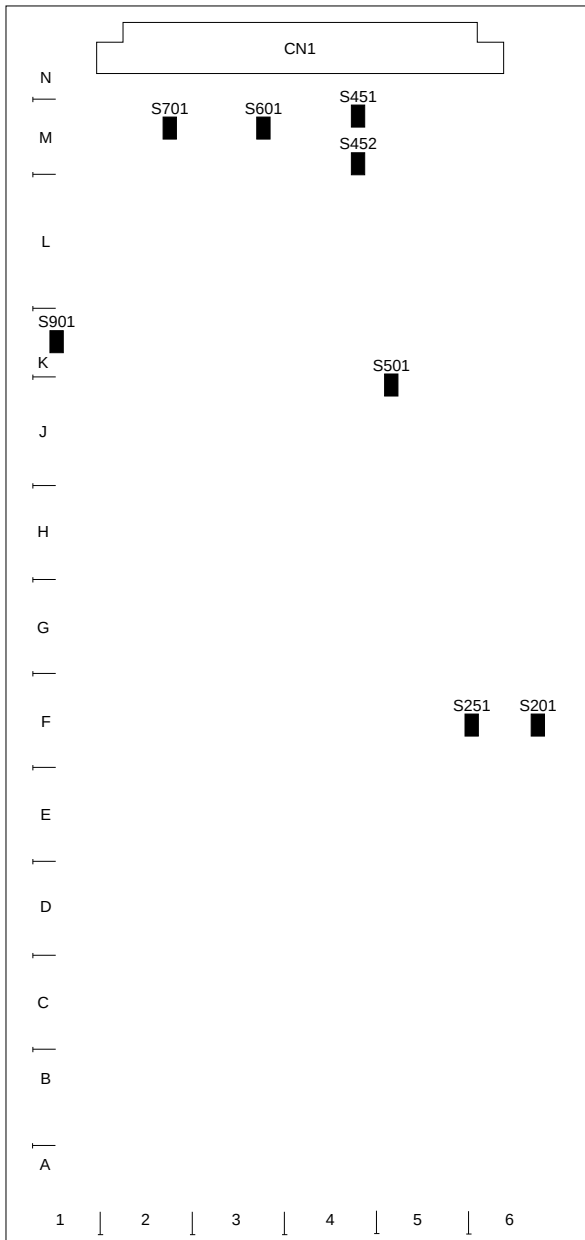
- **S107 (CAMERA POWER)**

This toggle switch is set to OFF when the power of the camera head is turned on. It is set to ON when the power of the camera head is turned off.

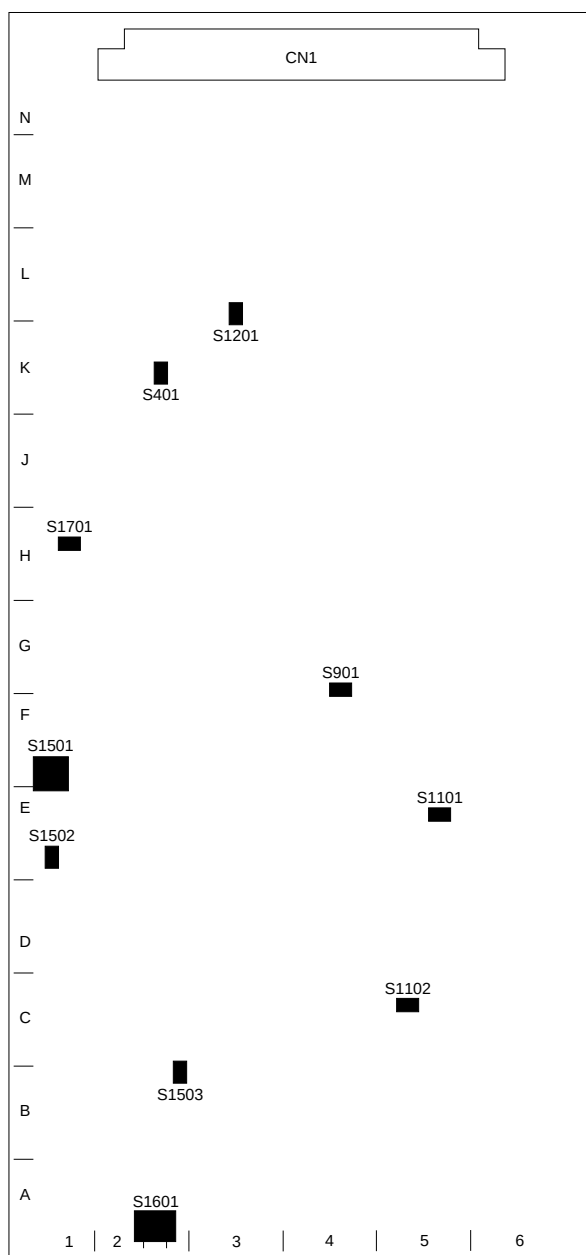
- **S108-1 to S108-8 Unused.**

Factory setting: OFF

AU-231 board

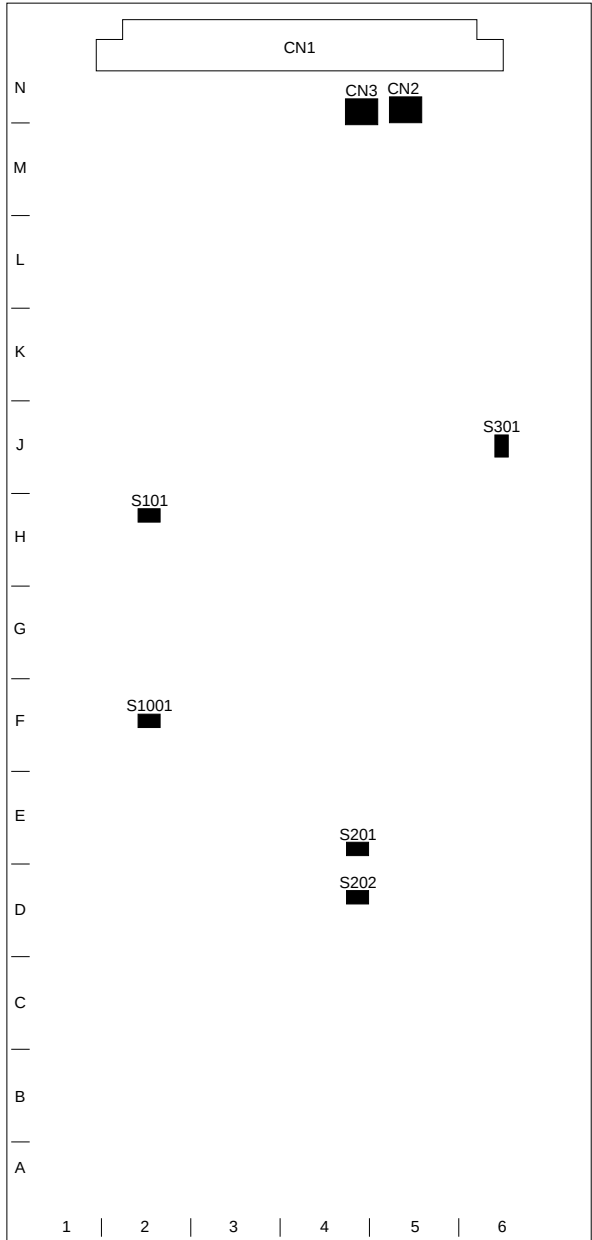


- **S601 (INCOM PROD SELECT)**
This switch selects the intercom system of a producer line.
4W: 4-wire system
RTS: RTS system
Factory setting: 4W
- **S701 (INCOM ENG SELECT)**
This switch selects the intercom system of an engineer line.
4W: 4-wire system
RTS: RTS system
Factory setting: 4W
- **S451 (PGM IN)**
This switch sets the PGM (program audio) level to 0 dBu or -20 dBu.
Factory setting: 0 dBu
- **S901 (INPUT SELECT)**
This switch is set to 1CH (PROD) or 2CH (PROD, ENG) according to the intercom system. This switch is fixed to PROD irrespective of the ENG/PRD selector switch setting on the camera and CCU sides when it is set to 1CH.
Factory setting: 2CH
- **S501 (PGM MIX)**
This switch selects whether to mix the program audio with the intercom audio or output the intercom audio and program audio separately to the right and left channels.
MIX: Mixes the intercom audio and program audio.
SEP: Outputs the intercom audio and program audio separately to the right and left channels.
MIX: Does not mix the program audio with the intercom audio.
Factory setting: OFF
- **S201 (MIC1 IN)**
This switch sets the audio signal level of the MIC OUTPUT CH-1 connector on the rear panel to 0 dBu or -20 dBu.
Factory setting: 0 dBu
- **S251 (MIC2 IN)**
This switch sets the audio signal level of the MIC OUTPUT CH-2 connector on the rear panel to 0 dBu or -20 dBu.
Factory setting: 0 dBu

VA-175 board

- **S901 (SEQ ON +/-)**
Select this switch to + or - according to the waveform monitor to be used.
+: NPN open collector output
-: PNP open collector output
Factory setting: -
- **S1101 (I/V ON/OFF)**
This switch is used for encoder circuit adjustment. When this switch is set to OFF, no I/V signal is contained in the composite video (VB or VBS) signal that this unit outputs because an I/V signal is not input to the chroma circuit (double-balanced circuit).
Factory setting: ON
- **S1102 (Q/U ON/OFF)**
This switch is used for encoder circuit adjustment. When this switch is set to OFF, no Q/U signal is contained in the composite video (VB or VBS) signal that this unit outputs because a Q/U signal is not input to the chroma circuit (double-balanced circuit).
Factory setting: ON
- **S1501 (H BLKG)**
This switch is used for H blanking width adjustment. During factory setting, this switch is set so that the H blanking width is $10.9 \pm 0.2 \mu\text{sec}$ for CCU-550 and $12.0 \pm 0.2 \mu\text{sec}$ for CCU-550P. Set this switch according to the application.
- **S1502 (V BLKG 19H/20H/21H)**
This switch sets the V blanking width to 19H, 20H, or 21H. Set this switch according to the application.
Factory setting: 20H
- **S1601 (REMOTE/LOCAL (0°)/LOCAL (180°))**
This switch selects whether to control the alignment of H.SC phase with an external genlock signal by a master setup unit (MUS-700) or this unit. The alignment of the H.SC phase can be controlled using RV1601 and RV1604 on the VA board when this switch is set to LOCAL. Set this switch to LOCAL when the remote control panel RCP series without H.SC phase control are connected to this unit. The SC phase can be selected to 180° when this switch is set to LOCAL (0°) and LOCAL (180°).
Factory setting: REMOTE
- **S1701 (CB SELECT)**
This switch sets the color bars signal output by this unit to SMPTE, EIAJ, or FULL. Set this switch according to the application.
Factory setting: SMPTE for CCU-550
EBU for CCU-550P
- **S1503 (VCO ON/OFF)**
To stop the VCO oscillation, set this switch to OFF.
Factory setting: ON
- **S401 (Y.R-Y.B-Y/RGB)**
This selects the signals of the Y/G, R-Y/R, and B-Y/B OUT connectors on the rear panel.
Factory setting: Y/R-Y/B-Y
- **S1201 (VBS3/SYNC)**
This switch selects the signal of the VBS3 OUT connector on the rear panel.

DM-110 board



- S201 (MODE AUTO/MANU)
The length of a triax cable connecting the camera head and CCU is automatically detected and set when this switch is set to AUTO. The triax cable length can be manually set using S202 (CABLE LENGTH SELECT) when this switch is set to MANU (MANUAL).
Factory setting: AUTO
- S202 (CABLE LENGTH SELECT)
This switch is valid when S201 is set to MANU. This switch is set to the number corresponding to the cable length.
Factory setting: 1 (120 m)

Switch setting	Cable length (center value)
1	120 m
2	360 m
3	600 m

- S101 (Y-ch 2nd AGC ON/OFF)
 - S301 (CHROMA-ch 2nd AGC ON/OFF)
- These switches are used for RF AGC adjustment.
Usually, set these switches to ON.

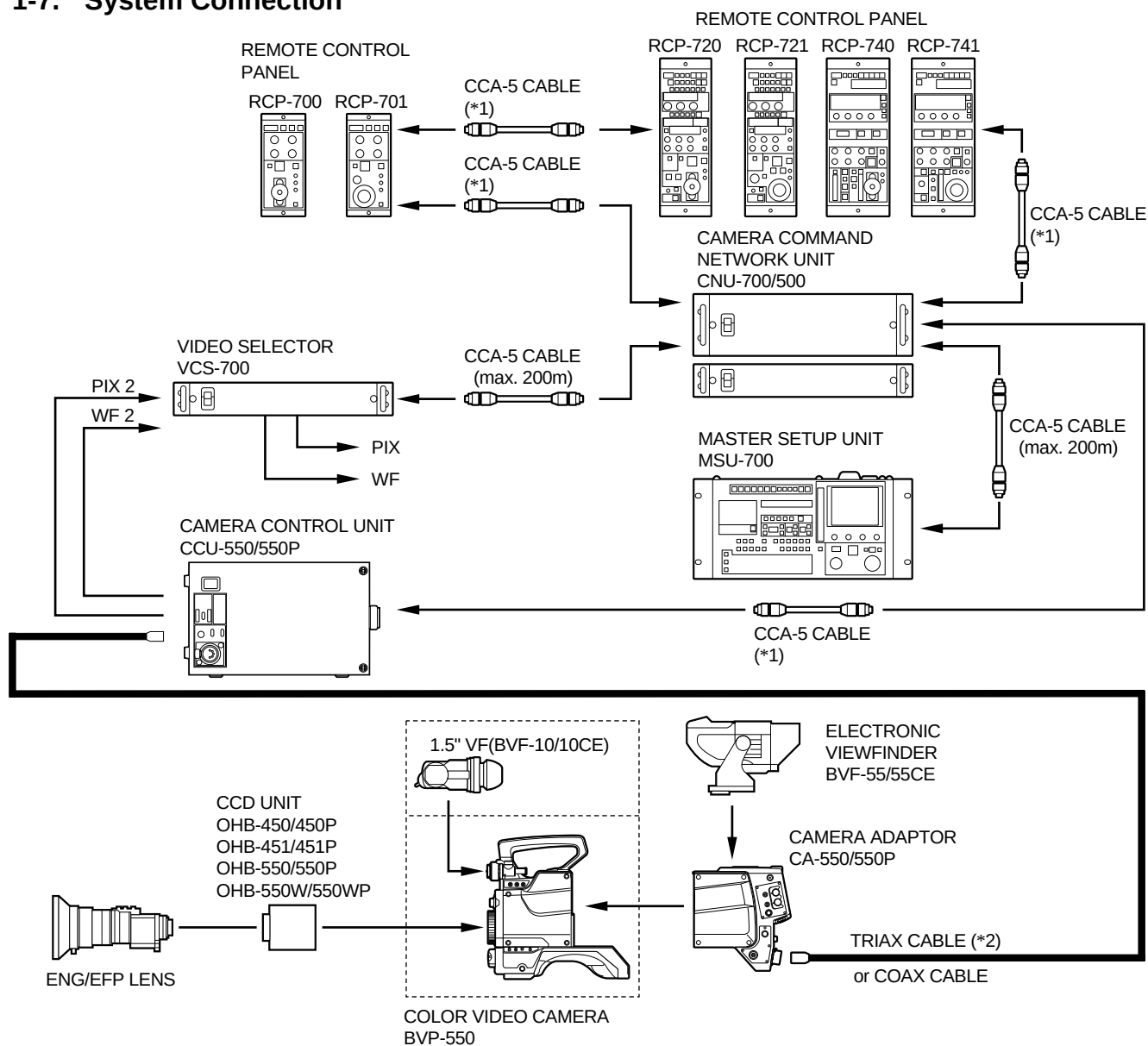


- S1001 (PROMPT SELECT RET3/PROMPT)
This switch sets the connection destination of a signal input to the PROMPTER/RET3 connector (BNC) on the rear panel.
RET3: Connected to the RET3 selection circuit.
PROMPT: Connected to the prompter transmission circuit.
Factory setting: PROMPT

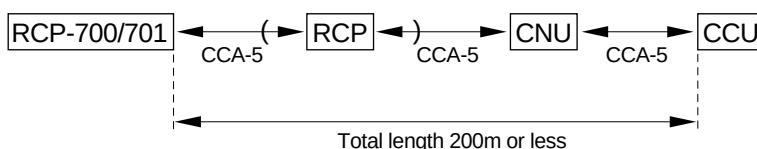
1-6. DM Connector Setting

The COAX connector (BNC) on the rear panel is used when the camera head and CCU are connected using a BNC cable instead of a triax cable. In this case, since no power is supplied to the camera head side, use a camera head that conforms to the stand-alone specification. For the camera head side, convert the triax connector into a BNC connector. For the CCU side, replace the connector on the DM-110 board. (Replace the RF cable connected to CN2 by CN3.)

1-7. System Connection



*1: CCA-5 CABLE LENGTH



Other optional accessories

For BVP-550	ELECTRET CONDENSER MICROPHONE ECM-MS5
	MICROPHONE C-74(Sony P/N 1-542-099-11)
	CRADLE SUSPENSION CRS-3P
	CARRYING CASE LC-303SFT
For CA-550/550P	TELEPROMPTER UNIT BKP-5971

*2: Triax cable length

Diameter	Extensible length
8.5 mm	700 m
14.5 mm	1400 m

Section 2

Service Overview

2-1. Notes on Spare Parts

1. Safety Related Components Warning

Components marked $\triangle$ are critical to safe operation. Therefore, specified parts should be used in the case of replacement.

2. Standardization of Parts

Some repair parts supplied by Sony differ from those used for the unit. These are because of parts commonality and improvement. Parts list has the present standardized repair parts.

3. Stock of Parts

Parts marked with “o” at SP(Supply Code) column of the spare parts list may be not stocked. Therefore, the delivery date will be delayed.

4. Units Representation

The following represented units are changed or omitted in writing.

Units		Representation
Capacitance	μF	μF
Inductance	μH	μH
Resistance	Ω	Abbreviation
Temperature	$^{\circ}\text{C}$	XXX-DEG-C

5. Destination Representation

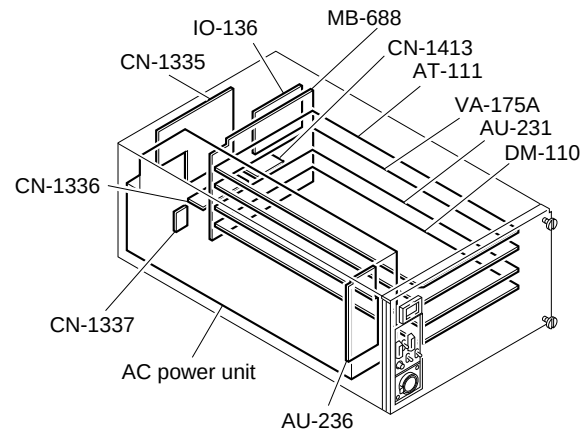
The part indicated “For J/UC/CE” in the spare parts list is used in the unit written below.

For J : The part is used in a unit for Japan.

For UC: The part is used in a unit for U.S.A. and Canada.

For CE : The part is used in a unit for regions except the above countries.

2-2. Board Layout



• AT-111 board

This board sends or receives the control data between the camera and CCU, and RCP, CNU, and CCU, controls the input/output signals on each board of this unit, and controls each tally signal. This board also sends or receives the control data to or from the BKP-5973 (CCU control panel).

• VA-175 board

This board produces VBS and RGB signals from the Y, R-Y, and B-Y signals sent from the DM-110 board, switches these signals, and outputs them as WF and PIX signals. This board also generates each sync signal and color bars signal.

• AU-231 board

This board demodulates the MIC RF signal sent from the camera, modulates a PGM signal, modulates and demodulates the INCOM signal and control data between the camera and CCU, and switches the INCOM line.

• DM-110 board

This board demodulates the Y RF signal sent from the camera to produce a Y signal and demodulates a chroma signal RF signal to produce R-Y and B-Y signals. This board also modulates the video signals input to the RET and PROMPT connectors on the rear panel and sends them to the camera.

• AU-236 board

This board inputs and outputs an INCOM signal on the front panel, displays a tally signal, and turns on and off the power of this unit and camera.

- **IO-136 board**

This board mixes the RF signal between the camera and CCU with the power of the camera.

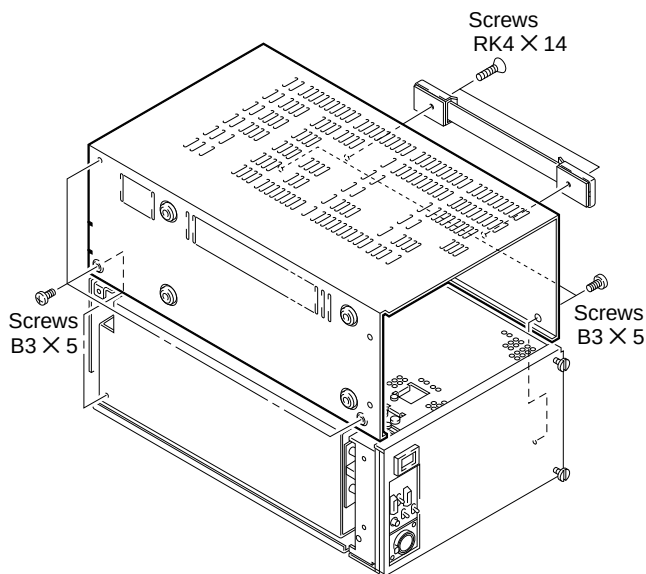
- **AC power unit**

This board supplies the power to the camera and supplies the power to each board of this unit.

2-3. Replacing the Main Parts

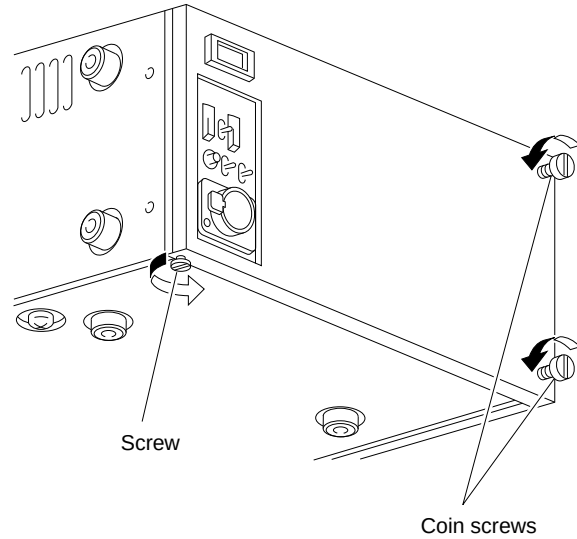
2-3-1. Removing the Top Cover

1. Remove the five screws.
2. Remove the two screws of the handle.

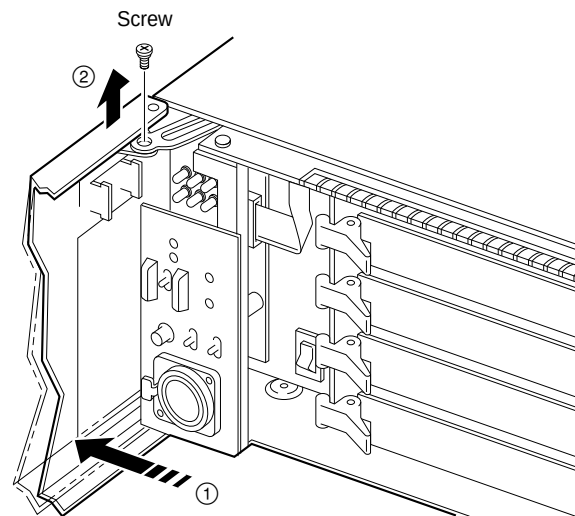


2-3-2. Removing the Front Panel

1. Remove one screw at the bottom of the front panel.
2. Loosen the two coin screws and open the front panel.



3. Remove one screw at the top.
4. Shift the front panel in the order of ① and ② and remove the front panel.

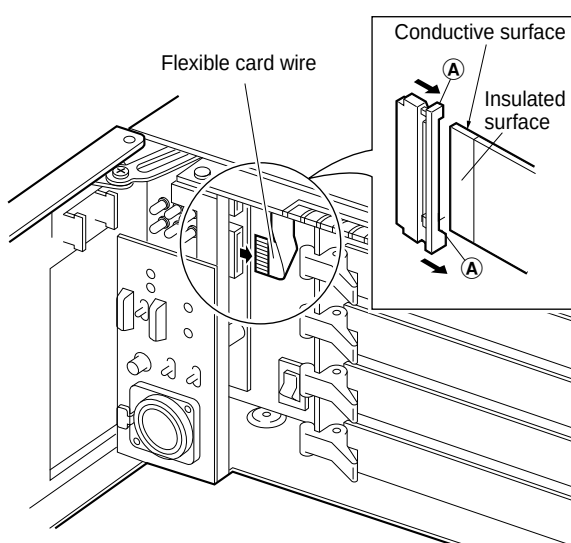


2-3-3. Removal and Installation of Flexible Card Wire

A flexible card wire is used between the MB-688 and AU-236 boards. Be careful not to break the flexible card wire. This may remarkably shorten the span of life. Handle it with care.

Removal

1. Turn off the power.
2. Take out section ① in the direction indicated by the arrow and pull out the flexible card wire.

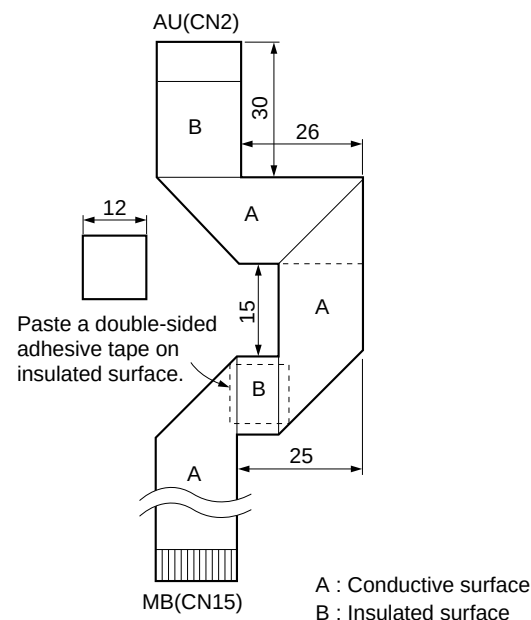


Forming

If using a new flexible card wire, hand form as shown in the figure in advance.

Note

Never reform the flexible card wire after being folded once.



Installation

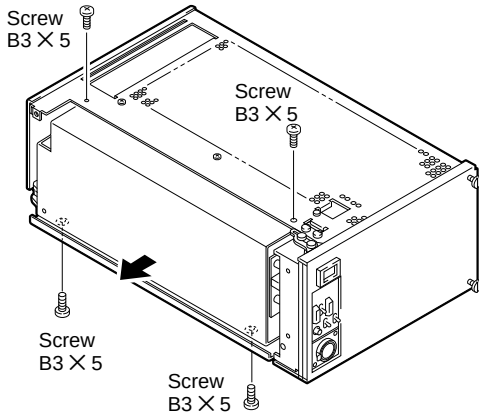
Notes

- Do not insert the flexible card wire obliquely.
- Confirm that no stain and dirt exist on the conductive surface of the flexible card wire.

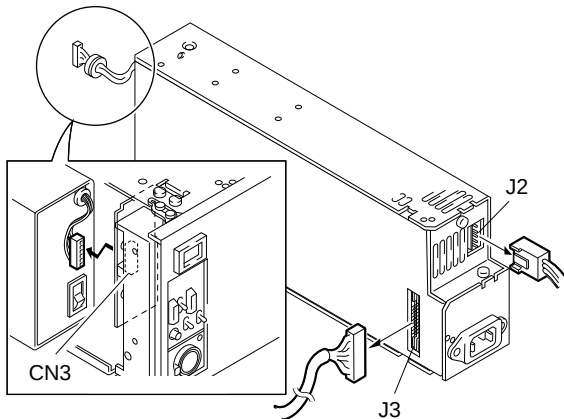
1. Put the insulation surface of the flexible card wire toward you and insert it firmly into the connector.
2. Return section ① to the former position and lock the connector.

2-3-4. Fuse Replacement

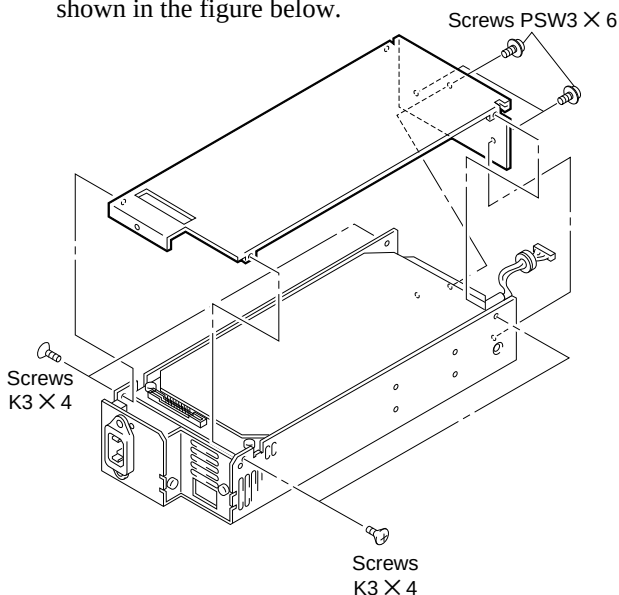
1. Pull out the power cord from the rear panel of the CCU-550.
2. Remove the top cover. (Refer to section 2-3-1. Removing the Top Cover.)
3. Remove the four screws.



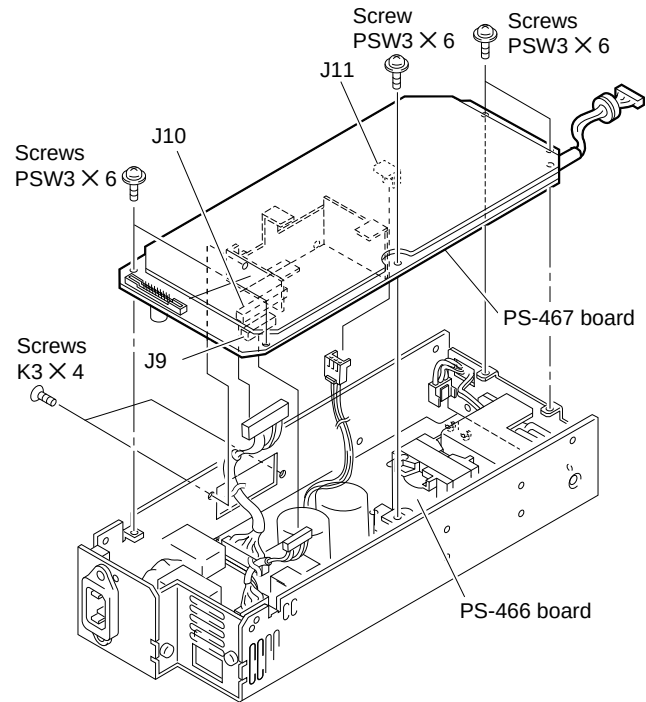
4. Disconnect the three connectors (J2/PS-466, J3/PS-467, and CN3/AU-236).



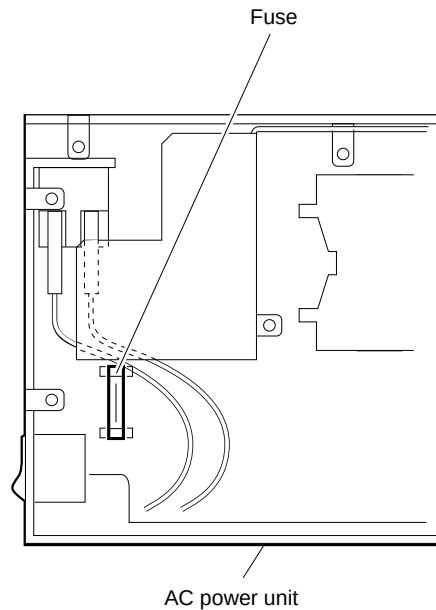
5. Remove the six screws and open the side panel as shown in the figure below.



6. Remove the seven screws, disconnect connectors (J9, J10, and J11), and remove the PS-467 board.



7. Replace the fuse on the PS-466 board.



8. After fuse replacement, install the power unit in the main unit in the reverse order of removal.
9. Connect the power cord, turn on the power of the CCU, and confirm that the CCU operates normally.

2-3-5. Lithium Battery Replacement

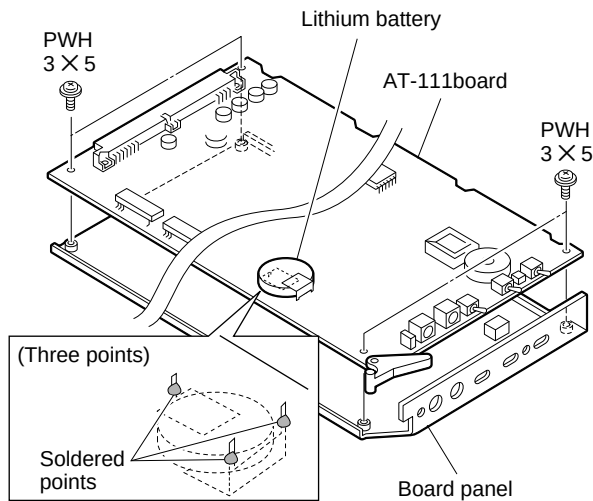
If the trouble below occurs when the CCU is used, replace the lithium battery on the AT-111 board.

Trouble

The setting of saturation is preset when the power switch of the CCU-550 is turned on and off with the CCU PAINT CLEAR switch (S106) on the AT-111 board set to OFF.

Replacement

1. Loosen the two coin screws and open the front panel.
2. Pull out the AT-111 board.
3. Remove the four screws, then remove the board panel.
4. Unsolder the three points on the AT-111 board and replace the lithium battery.



2-4. Caution During Board Replacement

Readjust and set the following items when the lithium battery on the AT-111 board is replaced or when the AT-111 board is replaced.

Adjustment item

- H phase adjustment
- SC phase adjustment
- Y OUT level adjustment
- R-Y/B-Y OUT level adjustment
- Y black adjustment
- R-Y/B-Y black balance adjustment

During installation of AD-130 board

- SDI Y black adjustment
- SDI R-Y black adjustment
- SDI B-Y black adjustment
- SDI Y level adjustment
- SDI R-Y level adjustment
- SDI B-Y level adjustment

Setting item

- Test signal selection
- Monitor signal selection
- Chroma ON/OFF
- Skin gate ON/OFF
- Saturation ON/OFF

2-5. Self-diagnosis Function

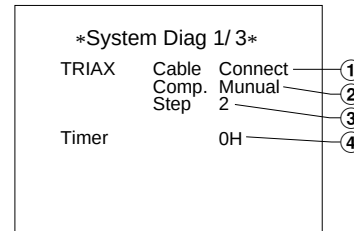
The CCU-550 has an internal character generator circuit and can display the state of the CCU-550 on the monitor as character information. To display the state on the monitor, the character information is mixed with a video signal and output from the PIX connector. The contents of the display can be changed by pressing the CHARACTER button of RCP-700 series.

The state of the CCU-550 is displayed when you press the CHARACTER button of the RCP to turn on it. The displayed page changes every time the CHARACTER button is pressed. The page continuously changes when the button is pressed continuously. The button goes off after all the pages are displayed.

• Self-diagnosis of the camera system

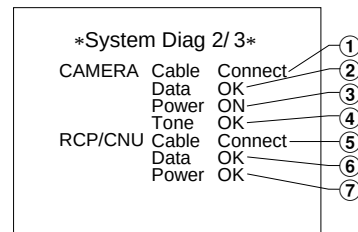
The self-diagnosis of the camera system consists of three pages. Page 1 of the self-diagnosis display appears when you press the CHARACTER button of RCP-700 series to turn on it. Press the CHARACTER button again. Pages 2 and 3 are then displayed sequentially.

Page 1 of the camera system's self-diagnosis display



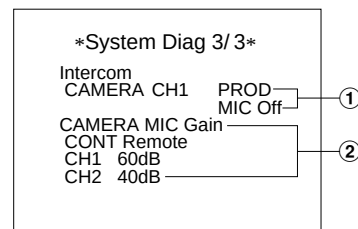
- ① Connection of triax cable (connect/open)
- ② Selection of triax cable compensation (auto/manual)
- ③ Cable length of triax cable (step indication in the circuit)
- ④ Current conduction time to the AT board

Page 2 of the camera system's self-diagnosis display



- ① Connection of camera cable
- ② Data from the camera
- ③ Power state of the camera
- ④ Identification tone state of the camera
- ⑤ Connection of cable to the RCP/CNU connector
- ⑥ Data from the RCP/CNU connector
- ⑦ Power of the RCP/CNU connector

Page 3 of the camera system's self-diagnosis display

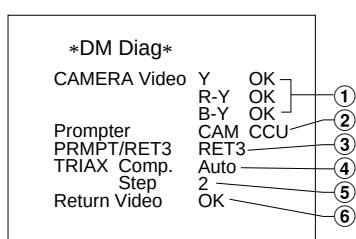


- ① Intercom state of the camera (producer line/engineer line)
- ② Gain and control state of the microphone circuit of the camera

• Self-diagnosis of the internal board of the CCU-550

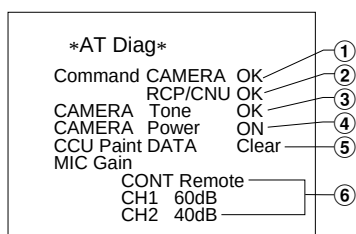
The self-diagnosis result of the DM board of the CCU-550 is displayed when you press the CHARACTER button of RCP-700 series with page 3 of the self-diagnosis display of the camera system displayed. Press the CHARACTER button again. The diagnosis results of each board are then displayed sequentially. If a trouble occurs during self-diagnosis, press the CHARACTER button. The display for the board on which the trouble occurred then appears.

DM board



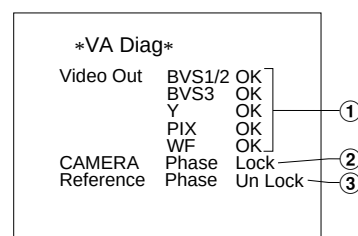
- ① State of Y, R-Y, and B-Y signals of triax signal
- ② Transmission state of prompter
- ③ Selection of prompter signal (PRMPT/RET3)
- ④ Selection of triax cable compensation (auto/manual)
- ⑤ Cable length of triax cable (step indication in the circuit)
- ⑥ State of return video signal

AT board



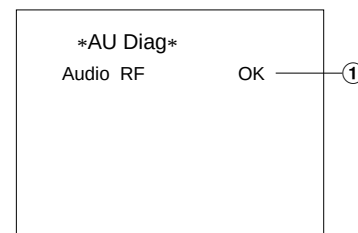
- ① Connection of commands to the CAMERA connector
- ② Connection of commands to the RCP/CNU connector
- ③ Check of identification tone from the camera
- ④ Power state of the camera
- ⑤ ON/OFF of analog control preset on the panel of the AT board of the CCU-550
- ⑥ Gain and control state of the microphone circuit of the camera

VA board



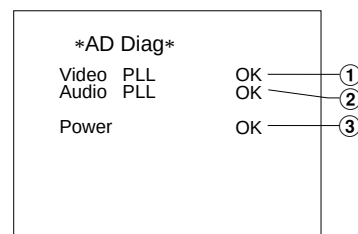
- ① Video signal output state of each video output connector
- ② Locking state of the H phase between the camera and CCU-550
- ③ Locking state of the CCU-550 with the input reference signal

AU board



- ① Triax PF signal state output from the AU board

AD board



- ① Locking state of the video serial clock with the video parallel clock (OK: Lock, NG: Unlock)
- ② Locking state of the audio clock with the video parallel clock (OK: Lock, NG: Unlock)
- ③ Check of the board power



Section 3

Electrical Alignment

3-1. Preparation

3-1-1. Equipment Required

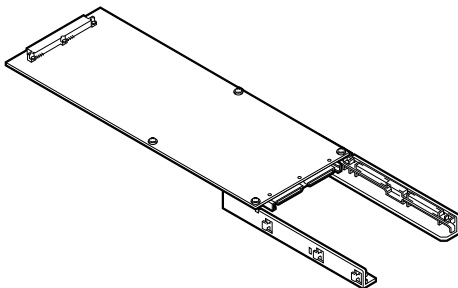
- Oscilloscope (Band width 300 MHz or more)
Tektronix 2465 or equivalent
- Waveform monitor Tektronix 1485R or equivalent
- Color monitor Sony BVM-1311/1411P or equivalent
- Vectorscope
- Video signal generator
Tektronix 1410 or equivalent (for NTSC)
Tektronix 1411 or equivalent (for PAL)
- Video camera Sony BVP-550/550P
- Camera adaptor Sony CA-550/550P
- CCD unit Sony OHB-450/550 series
- Master Setup Unit Sony MSU-700
- Digital voltmeter
- Frequency counter
- Audio generator
- Spectrum analyzer

3-1-2. Fixtures

Extension board EX-534

Extension for Board of CCU-550/550P (Optional)

Sony parts No: A-8277-639-A



3-1-3. Notes on Adjustment

- When adjusting STAIR CASE adjustment, connect the WF MODE connector of CCU-550/550P rear panel and remote control connector of waveform monitor with 3-pin cord. (Regarding the 3-pin cord, refer to Section 1.)
- Do not turn the following adjusting core of the following filter on the DM-110 board.
When the filter is out of order, replace it with a new one.
The adjustment for new part is not required.

DM-110 board

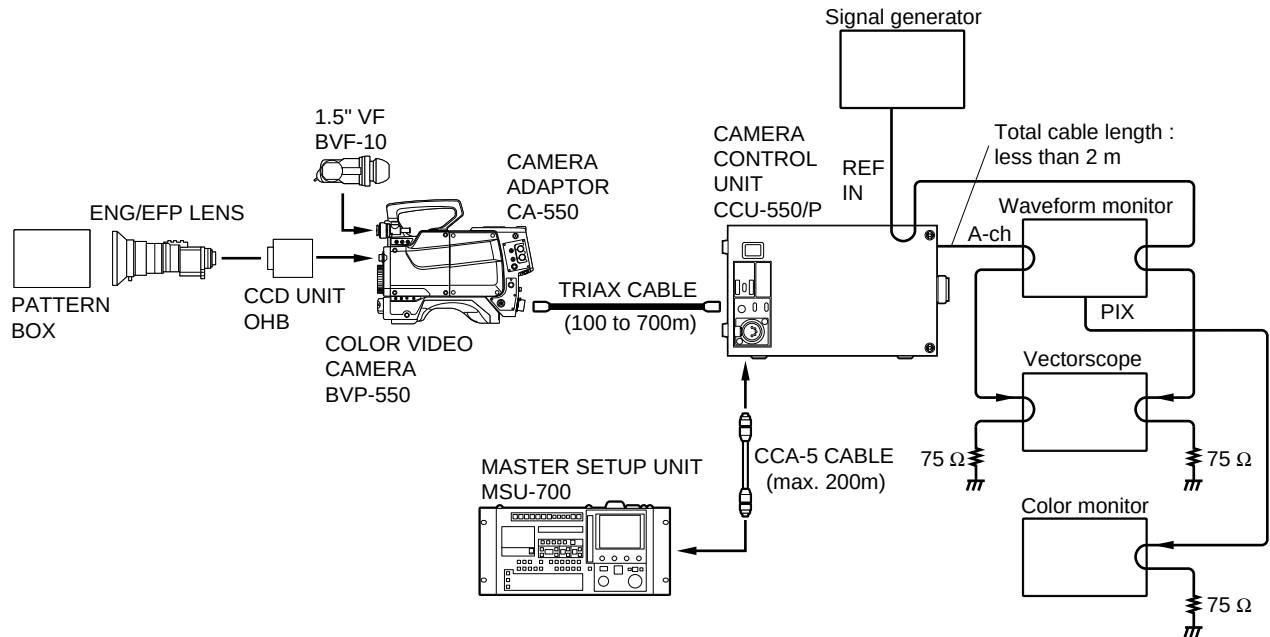
FL101, FL301, FL501, FL502, FL503, FL601, FL701,
FL801, FL901, FL902, FL1001

- Board names are some different between NTSC model (CCU-550) and PAL model (CCU-550P).
Read the board name in this section as following names.
VA-175 → VA-175A [For NTSC model]
VA-175 → VA-175P [For PAL model]
- Every adjustment is ranked from A to C. The ranking is given in the beginning of each adjustment item. The ranking is meant as follows .
Requires in installation : A
Requires in periodical check : A and B
Rank C is required only in replacement of part.

3-1-4. Connection

Notes

- Make sure that the adjustment for video camera has been completed.
- Connect as shown in the figure unless otherwise specified.



Audio Connection

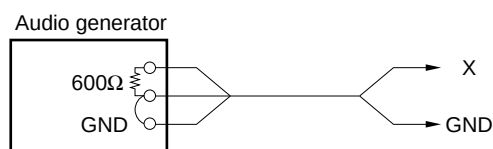


Fig. 1

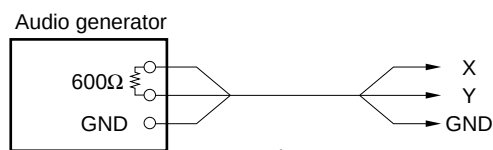


Fig. 2

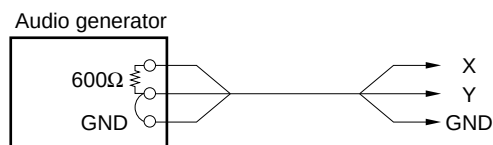


Fig. 3

3-1-5. Setting during Adjustment

1. Switches settings

Note

When switching the following switches from a customer-set position, it is recommended to record the setting state of the customer in the table below.

After adjustment is complete, be sure to return the switches to their customer-set position.

CCU-550/550P

Board	Switch	Setting during adjustment	Customer-set position
VA-175	S1502	20H (NTSC only)	
	S1601	LOCAL *1	
	S1701	SMPTE (for NTSC) EBU (for PAL)	
DM-110	S201	AUTO	
	S101	ON	
	S301	ON	
AT-111	S101	0 dB	
	S102	0 dB	

*1: S1601 is factory-set to "REMOTE".

MSU-700

- CAM POWER/Signal output select buttons

ALL button	→	OFF	(dark)
CAM PW button	→	ON	(lit)
TEST 1 button	→	OFF	(dark)
TEST 2 button	→	OFF	(dark)
BARS button	→	OFF	(dark)
CLOSE button	→	ON	(lit)
- CAMERA/CCU Function ON/OFF buttons

DETAIL OFF button	→	OFF	(lit)
KNEE OFF button	→	OFF	(lit)
AUTO KNEE button	→	OFF	(dark)
MATRIX OFF button	→	OFF	(lit)
- AUTO SETUP buttons

LEVEL button	→	OFF	(dark)
WHITE button	→	OFF	(dark)
BLACK button	→	OFF	(dark)
- Others

GAMMA OFF button	→	ON	(dark)
MASTER GAIN button	→	0	(0 dB)

2. Presetting compensation data

- Before adjustment, be sure to preset the compensation data to its center value.

Note

If missing presetting before adjustment, the adjustment values become invalid.

- How to preset the compensation data
 - Turn off the power of the CCU.
 - Confirm that the setting of S103 (CCU No.)/AT-111 is 96 or lower. *2
 - S104-8 (CONTROL CLEAR)/AT-111 → ON
 - Turn on the power of the CCU.

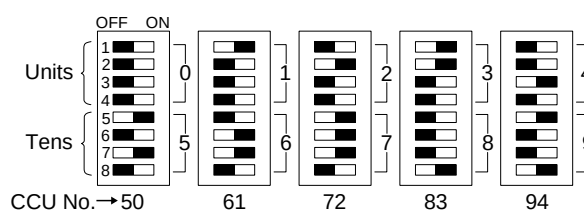
Note

Set S104-8/AT-111 to OFF after the overall adjustment is complete.

*2 S103 (CCU No.)/AT-111 switch

The switch is mainly used for the CCU number setting. The CCU number of 1 to 96 can be set in binary coded decimal (BCD) using the switches 1 to 8 of S103. The switches 1 to 4 determine the number of units and 5 to 8 determine the number of tens. For each digit, the number of 0 to f can be assigned. The numbers a to f, however, become invalid. The switches 1 to 8 are factory-set to OFF.

(Example)

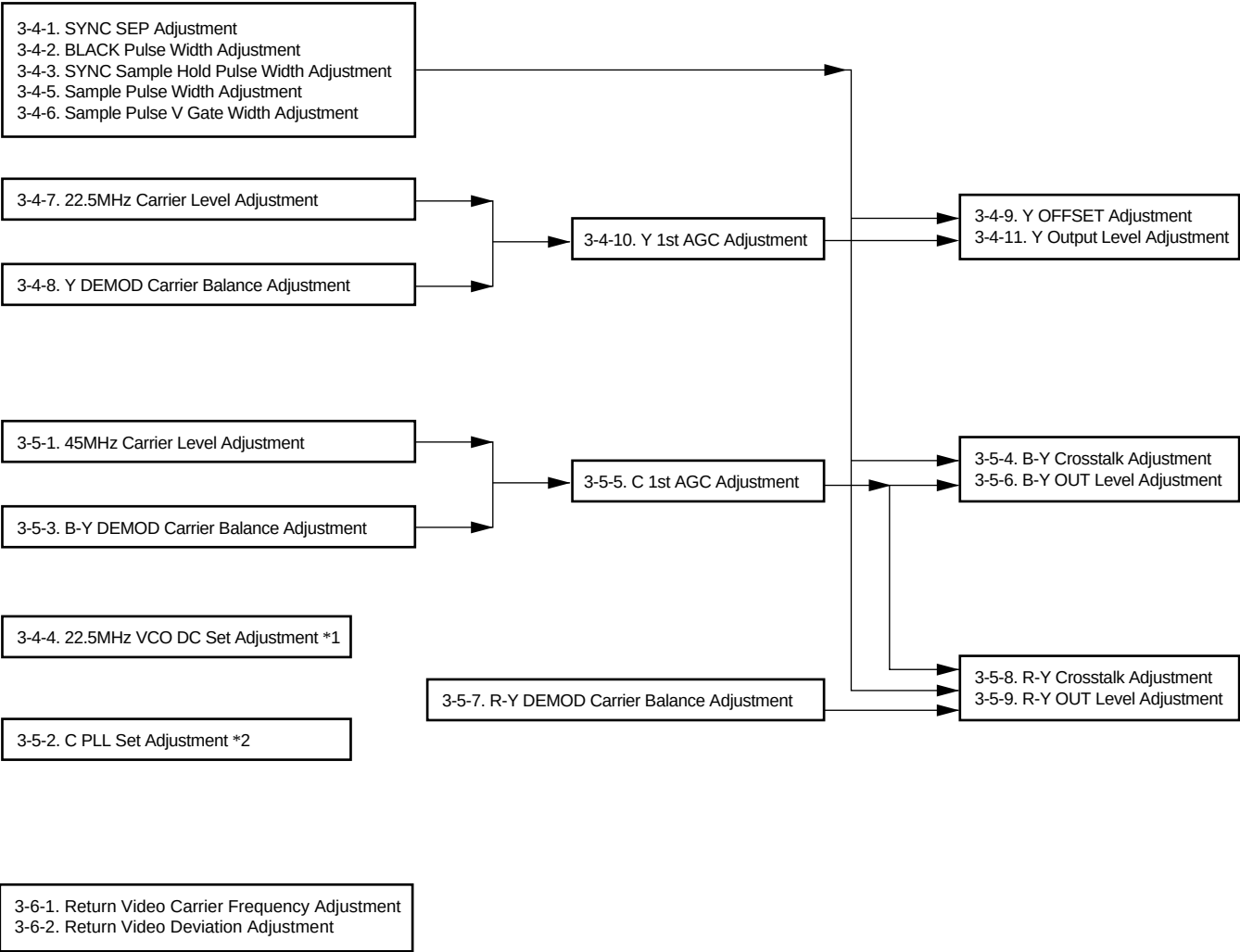


Notes

- Before presetting be sure to set the CCU number to 96 or lower with the S103/AT-111.
- Do not set the S104-8/AT-111 to ON with the S103-1 through S103-8/AT-111 set to ON. Otherwise the hour meter data stored in the microcomputer on AT-111 will be reset.
- Do not set the S104-8/AT-111 to ON with the S103-2 through S103-8/AT-111 set to ON. Otherwise the character signal set by a customer will be deleted.

3-2. Adjustment Items

If a certain adjustment is required, be sure to perform all of adjustments inside the frame enclosing that adjustment. Then, perform all inside frames indicated by the arrows.



3-3-2. SC Phase Adjustment

3-3-1. Sub-carrier Frequency Check

Rank:	C
Note:	Check to see that the signal is not input to the REFERENCE input connector of the rear panel on the CCU. Before adjustment, warm up the frequency counter more than four hours.

Equipment: Digital voltmeter, Oscilloscope,
Frequency counter

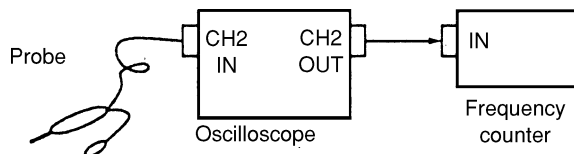
To be extended: VA-175 board

Adjustment Procedures:

1. Test point: IC1502-pin 14 (GND: E1701)/
VA-175 board

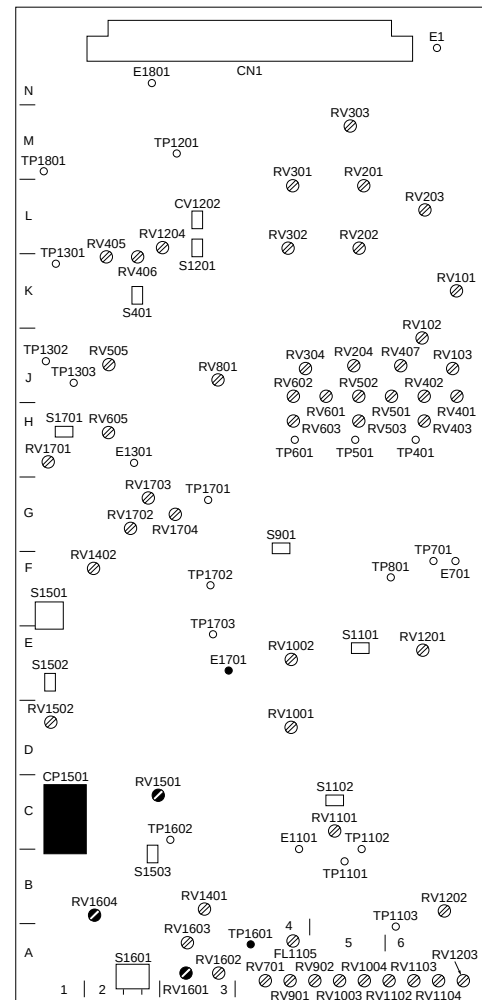
Adjustment point: RV1501 (LOCAL SC)/
VA-175 board

Specifications: $+2.5 \pm 0.1$ V dc



2. Connect the oscilloscope and the frequency counter as follows.
3. Test point: TP1601 (GND: E1701)/
VA-175 board

Adjustment point: RV1501 (LOCAL SC)
Specifications: 3,579,545 ± 2 Hz (for NTSC)
4,433,619 ± 2 Hz (for PAL)



VA-175 BOARD (A SIDE)

Rank: B
Equipment: Vectorscope

To be extended: VA-175 board

Preparations:

- The CCU-550/550P and video signal generator shall be externally synchronized.
- BARS button/MSU-700 → “ON”

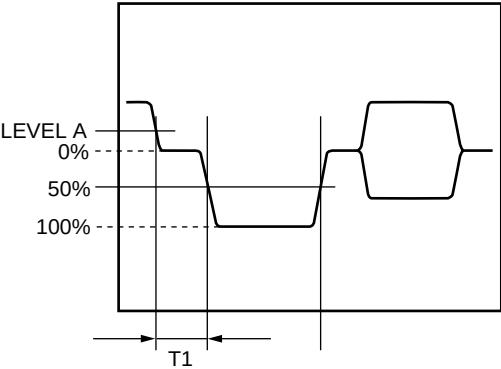
Test point: VBS 1 OUT connector/
CCU rear panel

Adjustment Procedures:

Observe the vectorscope and adjust ⓈRV1604 (SC PHASE RANGE)/VA-175 board so that the SC phase variable range due to ⓈRV1601 (SC PHASE)/VA-175 board is $188 \pm 2^\circ$.

3-3-3. SYNC Phase Adjustment

Rank: B
Equipment: Waveform monitor
To be extended: VA-175 board
Preparations:
• CLOSE button/MSU-700 → ON
• MASTER BLACK control/MSU-700 → 99
Test point: VBS 1 OUT connector/
CCU rear panel
Adjustment point: ⚙RV1402 (SYNC PHASE)/
VA-175 board
Specifications:
A = 4 IRE
T1 = $1.5 \pm 0.1 \mu\text{s}$ (for NTSC)
A = 350 mV
T1 = $1.65 \pm 0.1 \mu\text{s}$ (for PAL)

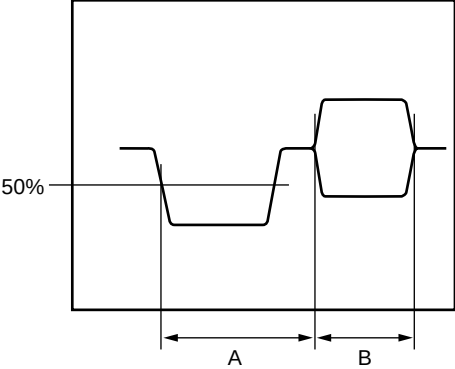


Setting after Adjustment:
Reset the MASTER BLACK level to the former value.

3-3-4. BF PULSE Adjustment

Rank: B
Equipment: Waveform monitor
To be extended: VA-175 board
Test point: VBS 1 OUT connector/
CCU rear panel

Adjustment Procedures:
1. Adjustment point: ⚙RV1001 (BF START)/
VA-175 board
Specifications: A = $5.3 \pm 0.1 \mu\text{s}$ (for NTSC)
A = $5.6 \pm 0.1 \mu\text{s}$ (for PAL)
2. Adjustment point: ⚙RV1002 (BF STOP)/
VA-175 board
Specifications: B = 9 cycles (for NTSC)
B = $2.25 \pm 0.2 \mu\text{s}$ (for PAL)



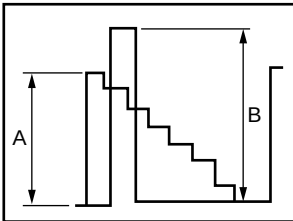
3-3-7. Color-Bar Level Adjustment

Rank: B
Equipment: Oscilloscope
To be extended: VA-175 board
Preparation:
 • BARS button/MSU-700 → “ON”

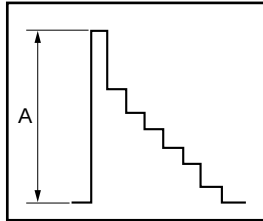
Adjustment Procedures:

- Test point: TP1701 (GND: E1701)/
VA-175 board
 Adjustment point: ●RV1701 (CB LEVEL)/
VA-175 board
 Specifications: $A = 525 \pm 5 \text{ mV}$ (for NTSC)
 $A = 700 \pm 10 \text{ mV}$ (for PAL)
- Test point: TP1701 (GND: E1701)/
VA-175 board
 Adjustment point: ●RV1704 (CB WHT LEVEL)/
VA-175 board (NTSC only)
 Specifications: $B = 700 \pm 10 \text{ mV p-p}$ (for NTSC)
- Repeat the procedures 1 and 2 until the specifications are met.

[For NTSC]



[For PAL]

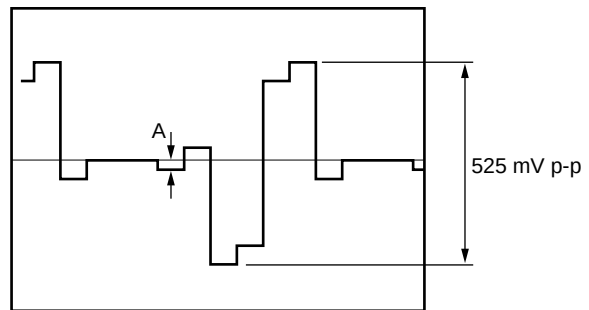


3-3-8. Color-Bar White Balance Adjustment

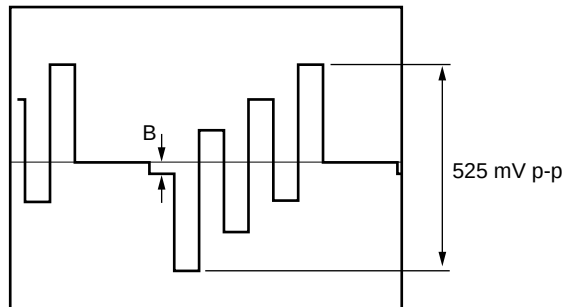
Rank: A
Equipment: Oscilloscope
To be extended: VA-175 board
Preparation:
 • BARS button/MSU-700 → “ON”

Adjustment Procedures:

- Test point: TP1702 (GND: E1701)/
VA-175 board
 Adjustment point: ●RV1703 (R BAL)/VA-175 board
 Specifications: $A = 0 \pm 5 \text{ mV}$



- Test point: TP1703 (GND: E1701)/
VA-175 board
 Adjustment point: ●RV1702 (B BAL)/VA-175 board
 Specifications: $B = 0 \pm 5 \text{ mV}$



3-3-9. VBS 1/2/3 OUT Levels Adjustment

Rank: A

Equipment: Waveform monitor, Vectorscope
(EXT REF mode)

To be extended: VA-175 board

Preparation:

- BARS button/MSU-700 → “ON”

Adjustment Procedures:

- Perform the following adjustments for each channel.

1. VA-175 board

[for NTSC]

Adjustment Procedures:

1. TEST point: VBS 1 OUT/rear panel
Adjust point: RV1203 (VBS LEVEL)/VA-175 board
RV1201 (VBS SETUP LEVEL)/
VA-175 board

Specifications : A = 100 ± 1 IRE (⊙RV1203)

$$C = 7.5 \pm 0.5 \text{ IRE } (\textcircled{\diagup}\text{RV1201})$$

2. TEST point: VBS 1 OUT/rear panel
Adjust point: RV1202 (VBS SYNC LEVEL)/
VA-175 board

Specifications : B = 40 ± 1 IRE

3. TEST point: VBS 2 OUT/rear panel
Check to see that the level “A” is 100 ± 1 IRE.
4. TEST point: VBS 3 OUT/rear panel
Adjust point: RV1204 (VBS 3 BAL)/VA-175 board
Specifications : A = 100 ± 1 IRE

Specifications : $A = 100 \pm 1$ IRE

[For PAL]

Adjustment Procedures:

1. TEST point: VBS 1 OUT/rear panel
Adjust point: RV1203 (VBS LEVEL)/VA-175 board
Specifications : $A = 700 \pm 1$ IRE
2. TEST point: VBS 1 OUT/rear panel
Adjust point: RV1202 (VBS SYNC LEVEL)/
VA-175 board

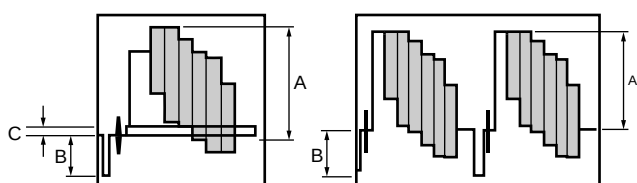
Specifications : $B = 300 \pm 10 \text{ mV}$

3. TEST point: VBS 2 OUT/rear panel
Check to see that the level “A” is 700 ± 10 mV.
4. TEST point: VBS 3 OUT/rear panel
Adjust point: RV1204 (VBS 3 BAL)/VA-175 board
Specifications : A = 700 ± 10 mV

Specifications : $A = 700 \pm 10 \text{ mV}$

[For NTSC]

[For PAL]



2. VA-175 board

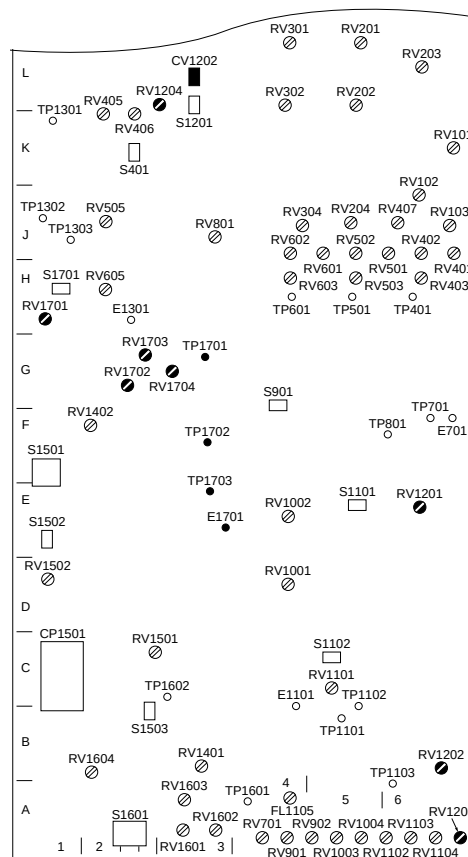
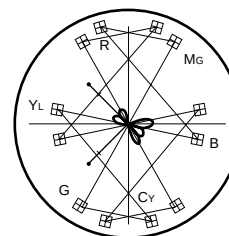
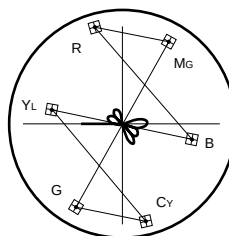
Test point/rear panel		Adj. point
VBS 3	VBS 3 OUT	CV1202

Specifications:

The beam spots for each color shall be positioned inside the corresponding frame  on the vectorscope.

[For NTSC]

[For PAL]



VA-175 BOARD (A SIDE)

3-3-10. I (V)/Q (U) Carrier Balance Adjustment

Note

Make sure that the vectorscope is correctly calibrated.

Rank: A

Equipment: Vectorscope (MAX GAIN mode)

To be extended: VA-175 board

Preparation:

- BARS button/MSU-700 → “ON”

Test point: VBS 1 OUT connector/
CCU rear panel

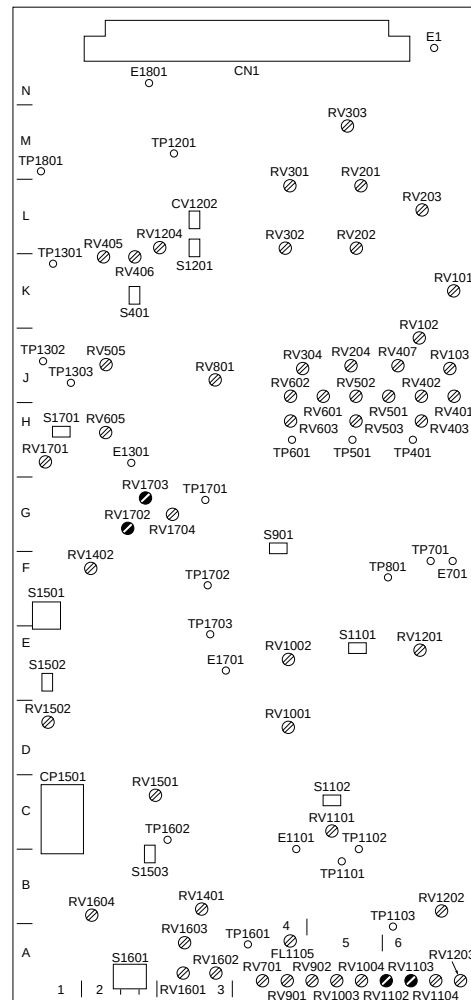
Adjustment points: ●RV1103 (I/V BLACK BAL)/
VA-175 board
●RV1102 (Q/U BLACK BAL)/
VA-175 board

Specifications:

Adjust so that the beam spot of black level is located in center of the vectorscope. (If the beam spot of color-bar white level is not located exactly in center of the vectorscope, adjust ⓈRV1703 (R BAL)/VA-175 board and ⓈRV1702 (B BAL)/VA-175 board alternately.)

Setting after Adjustment:

- GAIN switch/Vectorscope → 75% CAL.



VA-175 BOARD (A SIDE)

3-3-12. Burst Adjustment

Rank: B

Equipment: Vectorscope (INT REF mode)

To be extended: VA-175 board

Preparations:

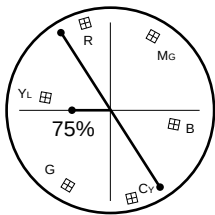
- BARS button/MSU-700 → “ON”
- S1101 (I/V ON/OFF)/VA-175 board → “ON”
- S1102 (Q/U ON/OFF)/VA-175 board → “OFF”

Test point: VBS 1 OUT connector/
CCU rear panel

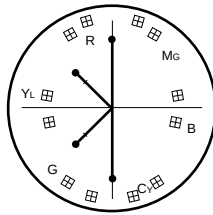
Adjustment Procedures:

1. Align the burst component to the B-Y axis with the PHASE control on the vectorscope.
2. Align the burst component to the 75% scale with $\odot$ RV1003 (BF LEVEL)/VA-175 board.

[For NTSC]

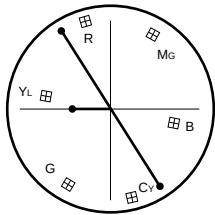


[For PAL]

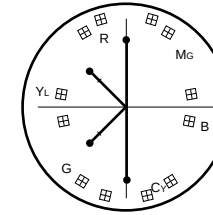


3. Confirm that the burst level at the VIDEO OUT connector is 40 ± 2 IRE for NTSC (300 ± 10 mV for PAL) using the waveform monitor.
4. Align both tips of the I (V) signal component to I (V) axis with $\odot$ RV1004 (BF PHASE)/VA-175 board.

[For NTSC]



[For PAL]

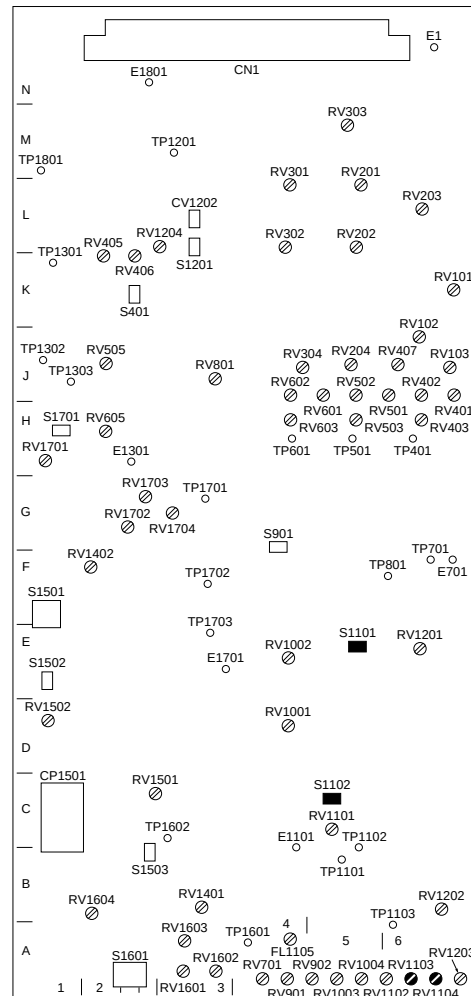


Setting after Adjustment:

- S1102 (Q/U ON/OFF)/VA-175 board → “ON”

Note:

- After the adjustment, confirm that the specifications for “3-3-11. Color Vector Adjustment” are satisfied.



VA-175 BOARD (A SIDE)

3-3-13. Y BLACK Adjustment

Rank: A

Equipment: Oscilloscope

To be extended: VA-175 board

Preparations:

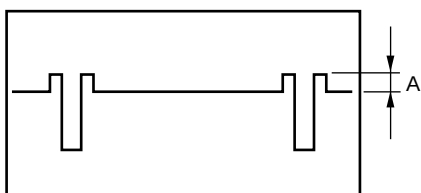
- BARS button/MSU-700 → OFF
- CLOSE button/MSU-700 → ON
- MASTER BLACK control/MSU-700 → -99

Test point: TP23 (GND:TP22)/Extention board

Adjustment point: ●RV101 (Y BLK)/VA-175 board

Specifications:

A = 0 ± 1 IRE	(for NTSC)
A = 0 ± 7 mV	(for PAL)



3-3-14. R-Y/B-Y Black Balance Adjustment

Rank: A

Equipment: Vectorscope (MAX GAIN mode)

To be extended: VA-175 board

Preparations:

- BARS button/MSU-700 → OFF
- CLOSE button/MSU-700 → ON
- MASTER BLACK control/MSU-700 → -99

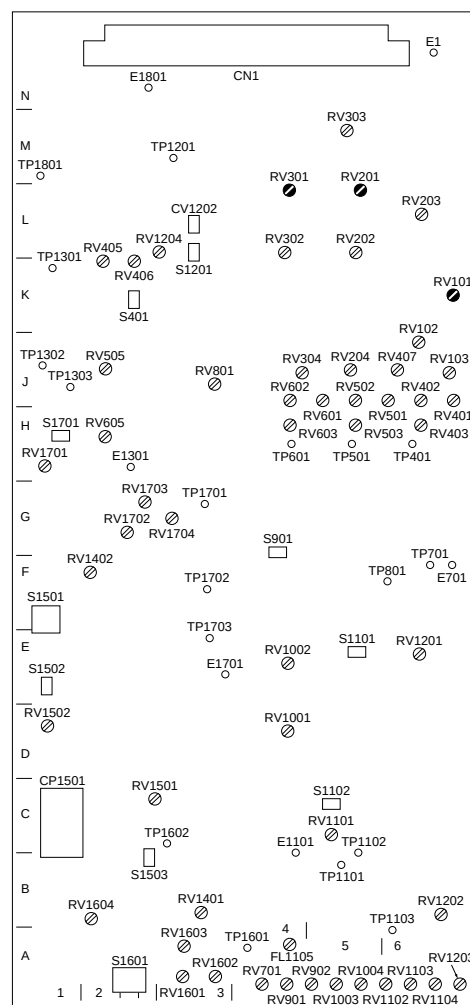
Test point: VBS 1 OUT connector/
CCU rear panel

Adjustment Procedures:

- Observe the vectorscope and adjust 0RV201 (R-Y BLK) and 0RV301 (B-Y BLK)/VA-175 board so that the beam spot of black level sit at the nearly center of the vectorscope.

Settings after Adjustment:

- GAIN switch/Vectorscope → 75% CAL
- MASTER BLACK control/MSU-700 → “0”



VA-175 BOARD (A SIDE)

3-3-15. WF OUT Level Adjustment

Rank: B

Equipment: Waveform monitor

To be extended: VA-175 board

Preparations:

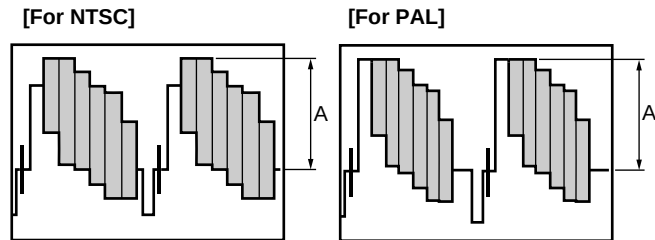
- BARS button/MSU-700 → “ON”
- MONITOR SELECT button/MSU-700 → “ENC”
- WF 1 OUT connector/CCU rear panel

Test point: WF OUT connector/CCU rear panel

Adjustment point: RV701 (WF1 VIDEO)/

VA-175 board

Specifications: $A = 100 \pm 1$ IRE (for NTSC)

$$A = 700 \pm 7 \text{ mV} \quad (\text{for PAL})$$


3-3-16. PIX OUT Level Adjustment

Rank: B

Equipment: Waveform monitor

To be extended: VA-175 board

Preparations:

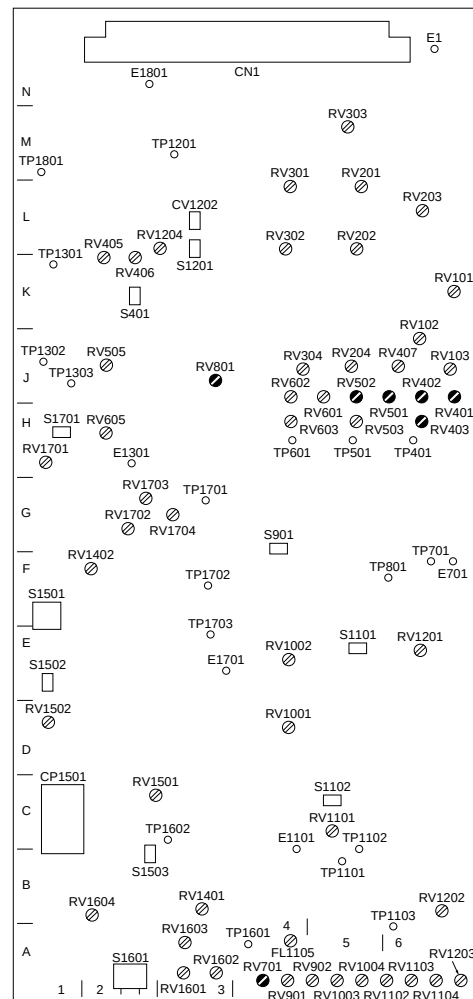
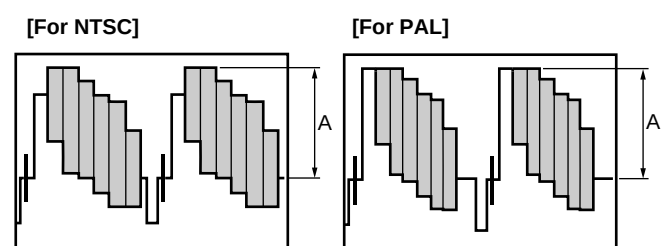
- BARS button/MSU-700 → “ON”
- MONITOR SELECT button/MSU-700 → “ENC”
- PIX OUT connector/CCU rear panel

Test point: PIX OUT connector/CCU rear panel

Adjustment point: ☒RV801 (PIX VIDEO)/

VA-175 board

Specifications: $A = 100 \pm 1$ IRE (for NTSC)

$$A = 700 \pm 7 \text{ mV} \quad (\text{for PAL})$$


VA-175 BOARD (A SIDE)

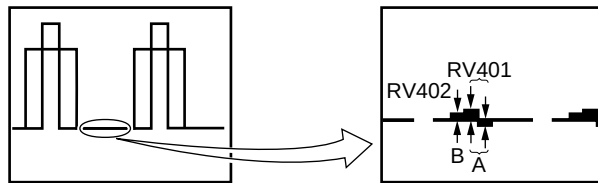
3-3-17. WF OUT G Level Adjustment

Rank: A
Equipment: Waveform monitor
To be extended: VA-175 board
Preparation:
• BARS button/MSU-700 → “ON”
Test point: WF OUT connector/CCU rear panel

Adjustment Procedures:

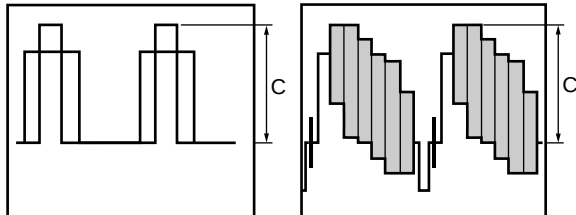
1. WAVEFORM MONITOR button/MSU-700 → “G”
2. Adjustment point: ●RV401(G MAT BAL1)/
VA-175 board
●RV402(G MAT BAL2)/
VA-175 board

Specifications: $A = 0 \pm 1$ IRE
 $B = 0 \pm 1$ IRE (for NTSC)
 $A = 0 \pm 7$ mV
 $B = 0 \pm 7$ mV (for PAL)

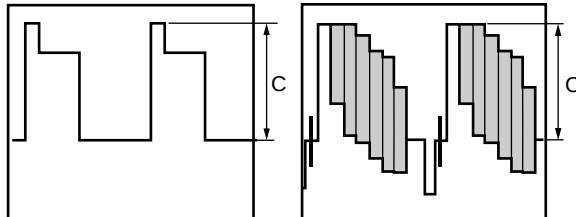


3. Adjust ●RV403(G WF LEVEL)/VA-175 board so that the white level “C” is equal even if WAVEFORM MONITOR button/MSU-700 is set to “G” or “ENC”.

[For NTSC]



[For PAL]



Specifications: 100 ± 1 IRE (for NTSC)
 700 ± 7 mV (for PAL)

Setting after Adjustment:

- WAVEFORM MONITOR button/MSU-700 → “ENC”

3-3-18. WF OUT R Level Adjustment

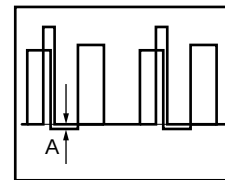
Rank: A
Equipment: Waveform monitor
To be extended: VA-175 board
Preparation:
• BARS button/MSU-700 → “ON”
Test point: WF OUT connector/CCU rear panel

Adjustment Procedures:

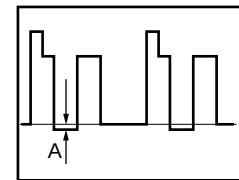
1. WAVEFORM MONITOR button/MSU-700 → “R”
2. Adjustment point: ●RV501(R MATRIX BAL)/
VA-175 board

Specifications: $A = 0 \pm 1$ IRE (for NTSC)
 $A = 0 \pm 7$ mV (for PAL)

[For NTSC]



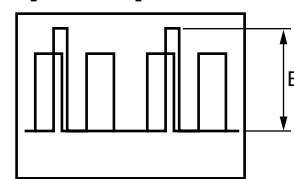
[For PAL]



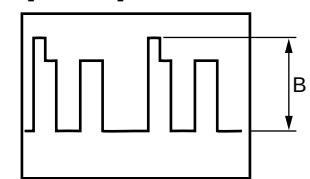
3. Adjust ●RV502(R WF LEVEL)/VA-175 board so that the level “B” is equal even if WAVEFORM MONITOR button/MSU-700 is set to “R” or “G”.

Specifications: $B = 100 \pm 1$ IRE (for NTSC)
 $B = 700 \pm 7$ mV (for PAL)

[For NTSC]



[For PAL]



Setting after Adjustment:

- WAVEFORM MONITOR button/MSU-700 → “ENC”

3-3-19. WF OUT B Level Adjustment

Rank: A

Equipment: Waveform monitor

To be extended: VA-175 board

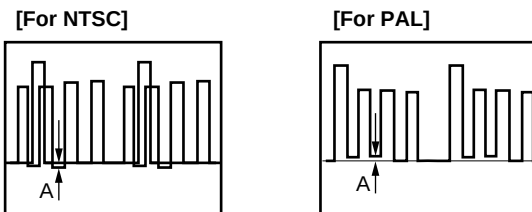
Preparation:

- BARS button/MSU-700 → “ON”

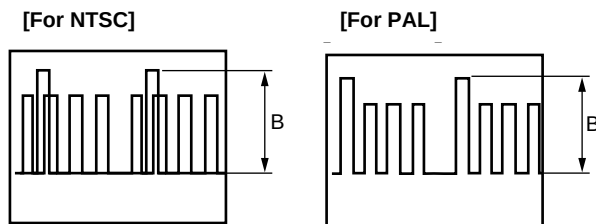
Test point: WF OUT connector/CCU rear panel

Adjustment Procedures:

1. WAVEFORM MONITOR button/MSU-700 → “B”
 2. Adjustment point: ⚫RV601(B MATRIX BAL)/VA-175 board
- Specifications:
- | | |
|---------------------------|------------|
| $A = 0 \pm_{-0}^{+1}$ IRE | (for NTSC) |
| $A = 0 \pm_{-0}^{+7}$ mV | (for PAL) |



3. Adjust ●RV602(B WF LEVEL)/VA-175 board so that
the level “B” is equal even if WAVEFORM MONI-
TOR button/MSU-700 is set to “B” or “G”.
Specifications:
- | | | | |
|-----|-------------|-----|------------|
| B = | 100 ± 1 | IRE | (for NTSC) |
| B = | 700 ± 7 | mV | (for PAL) |



Setting after Adjustment:

- WAVEFORM MONITOR button/MSU-700 → “ENC”

3-3-20. WF OUT R/B DC Offset Adjustment

Rank: B

Equipment: Oscilloscope

To be extended: VA-175 board

Preparation:

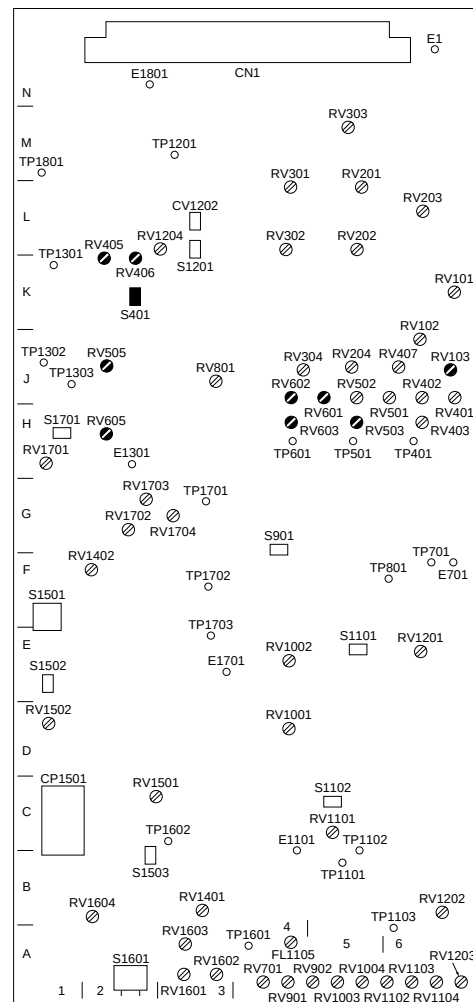
- CLOSE button/MSU-700 → “ON”

Test point: WF OUT connector/CCU rear panel

Adjustment Procedures:

- Adjust $\odot$ RV503(R DC BAL) and $\odot$ RV603(B DC BAL)/VA-175 board so that the DC levels of R and B are equal to G even if the WAVEFORM MONITOR button/MSU-700 is set to “G”, “R” or “B”.

Specifications: DC Level for “G” ± 1 mV



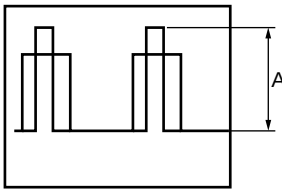
VA-175 BOARD (A SIDE)

3-3-21. R/G/B OUT Level Adjustment

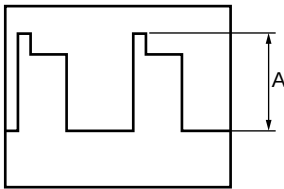
- Rank:** A
- Equipment:** Waveform monitor
- To be extended:** VA-175 board
- Preparations:**
- BARS button/MSU-700 → “ON”
 - S401/VA-175 board → “R/G/B”

Test point/ rear panel	Adj. point	Specifications
G G OUT	RV406	$A = 700 \pm 10 \text{ mV p-p}$
R R OUT	RV505	
B B OUT	RV605	

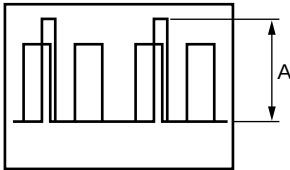
[For NTSC]G-ch



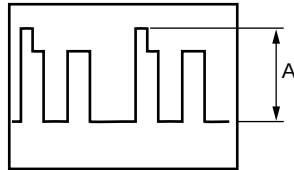
[For PAL]G-ch



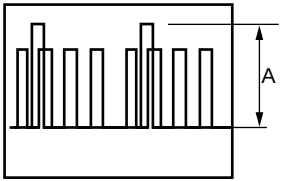
[For NTSC]R-ch



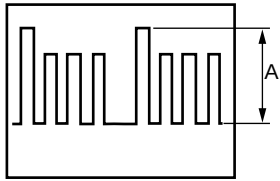
[For PAL]R-ch



[For NTSC]B-ch



[For PAL]B-ch



3-3-22. Y OUT Level Adjustment

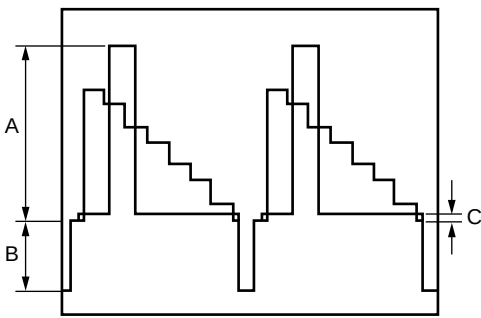
- Rank:** A
- Equipment:** Waveform monitor
- To be extended:** VA-175 board
- Preparations:**
- BARS button/MSU-700 → “ON”
 - S401/VA-175 board → “Y/R-Y/B-Y”

Test point: Y OUT connector/CCU rear panel

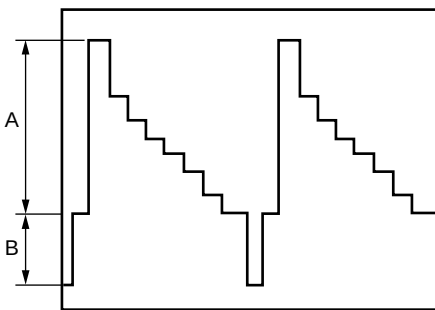
Adjustment Procedures:
VA-175 board

	Adj. point	Specifications
Y Level	RV103	$A = 100 \pm 1 \text{ IRE}$ (for NTSC) $A = 700 \pm 10 \text{ mV}$ (for PAL)
SYNC Level	RV405	$B = 40 \pm 1 \text{ IRE}$ (for NTSC) $B = 300 \pm 7 \text{ mV}$ (for PAL)
SETUP Level	RV405	$C = 7.5 \pm 0.5 \text{ IRE}$ (NTSC only)

[For NTSC]



[For PAL]



3-3-23. R-Y/B-Y OUT Level Adjustment

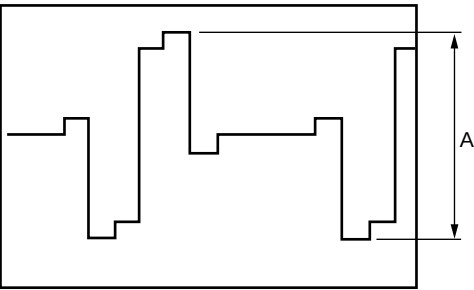
Rank: A
Equipment: Oscilloscope
To be extended: VA-175 board
Preparation:
• BARS button/MSU-700 → “ON”

Adjustment Procedures:

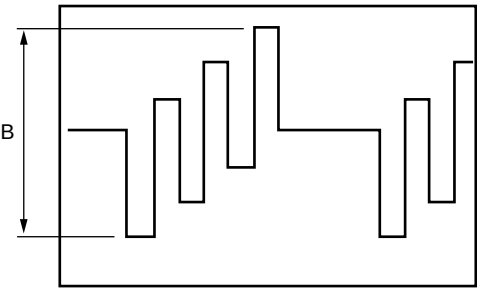
VA-175 board

Test point/ rear panel	Adj. point	Specifications
R-Y R-Y OUT	RV204	A = 700 ±5 mV p-p (for NTSC) A = 525 ±5 mV p-p (for PAL)
B-Y B-Y OUT	RV304	B = 700 ±5 mV p-p (for NTSC) B = 525 ±5 mV p-p (for PAL)

R-Y OUT



B-Y OUT



3-3-24. R-Y/B-Y IN Level Adjustment

Note:
A VA-175 board with the suffix -12 or higher requires this adjustment.

Rank: A
Equipment: Oscilloscope
To be extended: VA-175 board
Preparation:

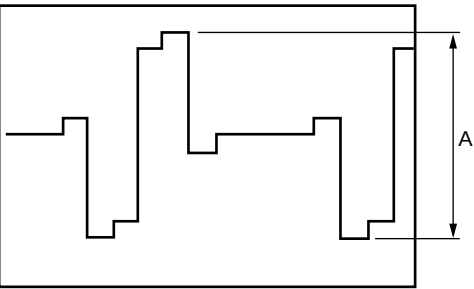
- Output the color-bar signal by operating the setup menu of the BVP-550/550P. (Refer to “3-1.Setup Menu” in the BVP-550/550P maintenance manual.)
MENU: System config
PAGE: Y/CHROMA (P2)
ITEM: CB → ON

Adjustment Procedures:

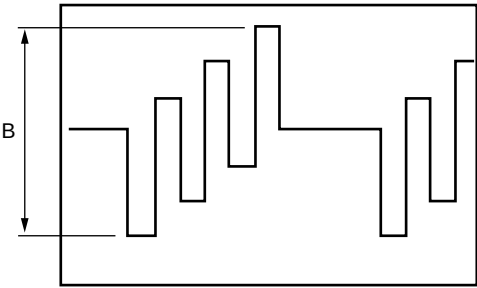
VA-175 board

Test point	Adj. point	Specifications
R-Y TP201(GND:E1)	RV203	A = 490 ±5 mV p-p
B-Y TP301(GND:E1)	RV303	A = 490 ±5 mV p-p

R-Y OUT



B-Y OUT



Setting after Adjustment:

- Setup menu/BVP-550
MENU: System config
PAGE: Y/CHROMA (P2)
ITEM: CB → OFF

3-3-25. R-Y/B-Y Gain Balance Adjustment

Rank: A
Equipment: Waveform monitor
To be extended: VA-175 board
Preparation:

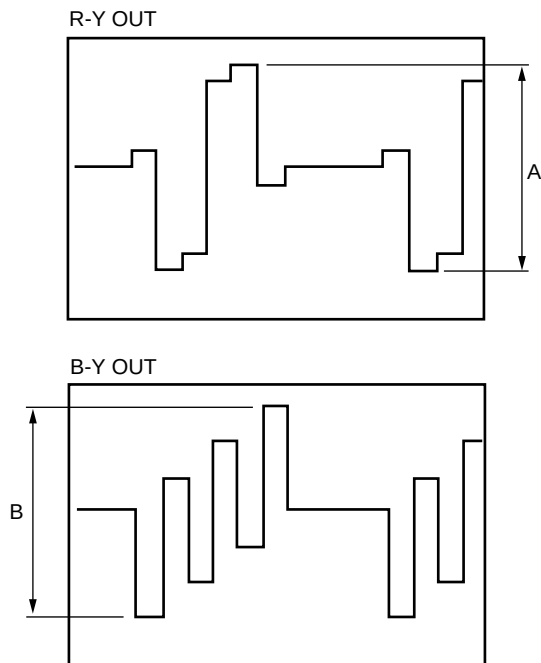
- Output the color-bar signal by operating the setup menu of the BVP-550/550P. (Refer to “3-1.Setup Menu” in the BVP-550/550P maintenance manual.)

MENU: System config
PAGE: Y/CHROMA (P2)
ITEM: CB → ON

Adjustment Procedures:

VA-175 board

Test point/ rear panel	Adj. point	Specifications
R-Y R-Y OUT	RV202	A = 700 ± 5 mV p-p (for NTSC) A = 525 ± 3 mV p-p (for PAL)
B-Y B-Y OUT	RV302	B = 700 ± 5 mV p-p (for NTSC) B = 525 ± 3 mV p-p (for PAL)



Setting after Adjustment:

- Setup menu/BVP-550
- MENU:** System config
PAGE: Y/CHROMA (P2)
ITEM: CB → OFF

3-3-26. STAIR CASE Adjustment

Rank: A
Note:

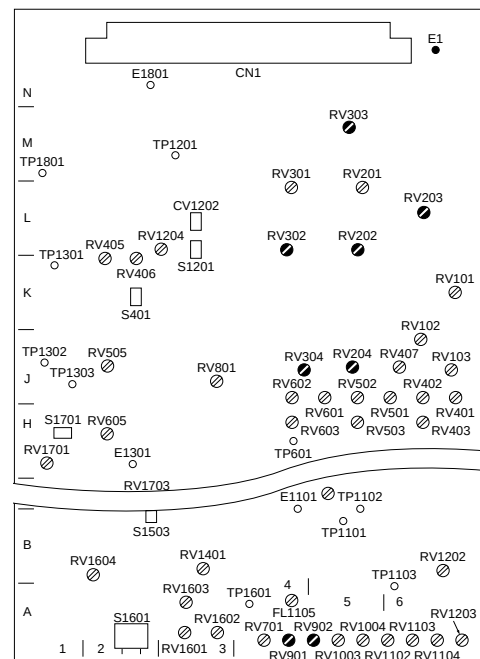
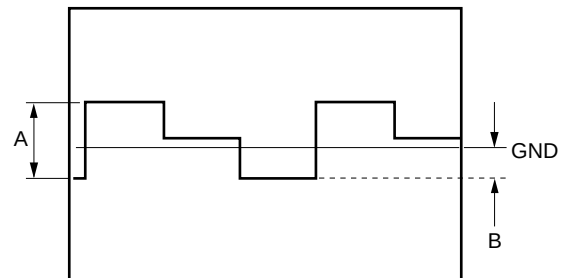
This adjustment is for temporary adjustment when repairing the STAIR CASE block. In the system set up, the readjustment is required to match the characteristic of waveform monitor.

Equipment: Oscilloscope
To be extended: VA-175 board

Test point: pin 56(GND: pin 57)/
 extension board

Adjustment point: RV901 (STAIR CASE POSITION)/
 VA-175 board
 RV902(STAIR CASE LEVEL)/
 VA-175 board

Specifications: A = 10.0 ± 0.5 V p-p (RV902)
 B = 0 ± 0.5 V dc (RV901)

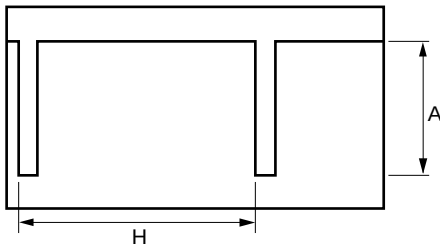


VA-175 BOARD (A SIDE)

3-4. Y Cable Compensation System Adjustment

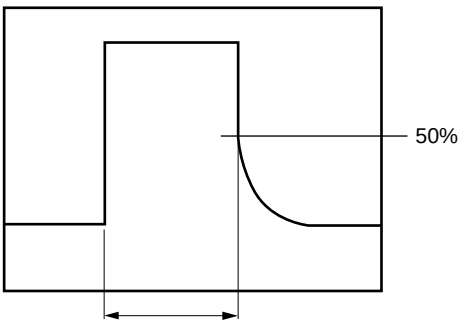
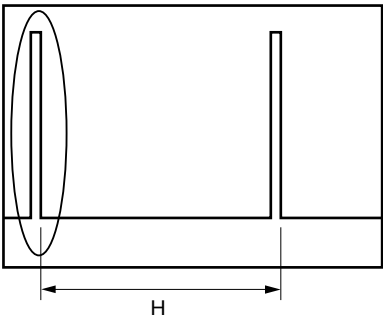
3-4-1. SYNC SEP Adjustment

Rank: B
Equipment: Oscilloscope
To be extended: DM-110 board
Preparation:
• CLOSE button/MSU-700 → “ON”
Test point: TP401 (GND: E101)/DM-110 board
Adjustment point: ⚙LV401/DM-110 board
Specifications: Level “A” shall be maximum.



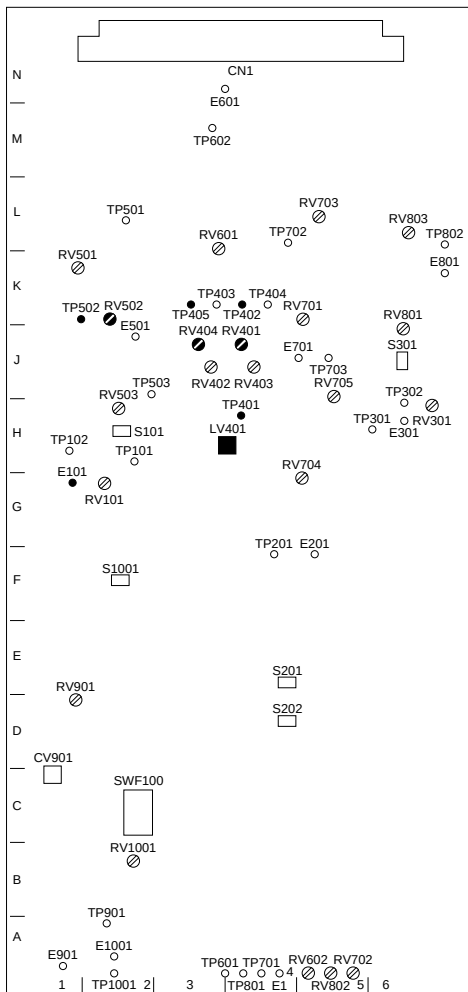
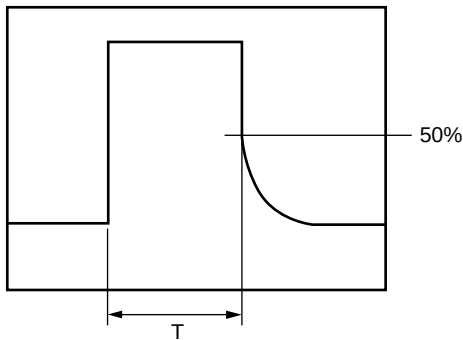
3-4-2. BLACK Pulse Width Adjustment

Rank: B
Equipment: Oscilloscope
To be extended: DM-110 board
Test point: TP402 (GND: E101)/DM-110 board
Adjustment point: ⚙RV401 (BLACK S/H)/DM-110 board
Specifications: $T = 1.7 \pm 0.1 \mu s$



3-4-3. SYNC Sample/Hold Pulse Width Adjustment

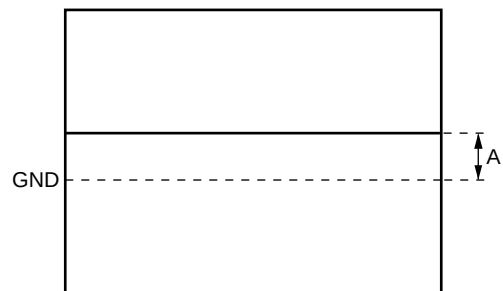
Rank: B
Equipment: Oscilloscope
To be extended: DM-110 board
Test point: TP405 (GND: E101)/DM-110 board
Adjustment point: RV404 (SYNC S/H)/DM-110 board
Specifications: $T = 1.3 \pm 0.1 \mu s$



DM-110 BOARD (A SIDE)

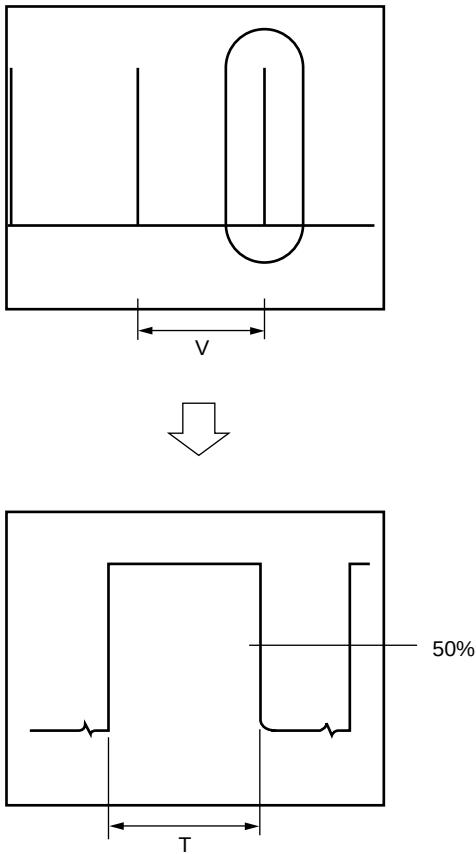
3-4-4. 22.5 MHz VCO DC Set Adjustment

Rank: C
Note: Confirm that 45 MHz frequency on the MD-103 board (CA-550/550P) is correct.
Equipment: Oscilloscope
To be extended: DM-110 board
Test point: TP502 (GND: E101)/DM-110 board
Adjustment point: RV502 (VCO DC SET)/DM-110 board
Specifications: $A = 0 \pm 30 \text{ mV dc}$



3-4-5. Sample Pulse Width Adjustment

Rank: B
Equipment: Oscilloscope
To be extended: DM-110 board
Test point: TP404 (GND: E101)/DM-110 board
Adjustment point: ⚙RV403 (SAMPLE S/H)/DM-110 board
Specifications: $T = 40.0 \pm 2.0 \mu s$

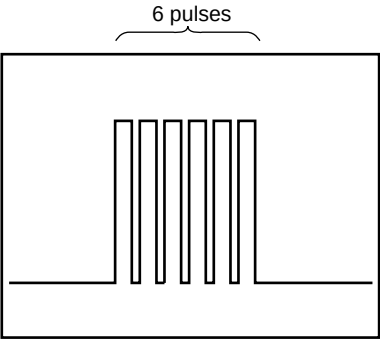


3-4-6. Sample Pulse V Gate Width Adjustment

Rank: B
Equipment: Oscilloscope
To be extended: DM-110 board
Test point: TP403 (GND: E101)/DM-110 board
Adjustment point: ⚙RV402 (SAMPLE GATE)/DM-110 board

Adjustment Procedures:

- Confirm that the sample pulses have six pulses in both odd and even fields.
If the specifications are not met, adjust ⚙RV402 (SAMPLE GATE)/DM-110 board so that the sample pulses have six pulses in both odd and even fields.



3-4-7. 22.5 MHz Carrier Level Adjustment

Rank: B

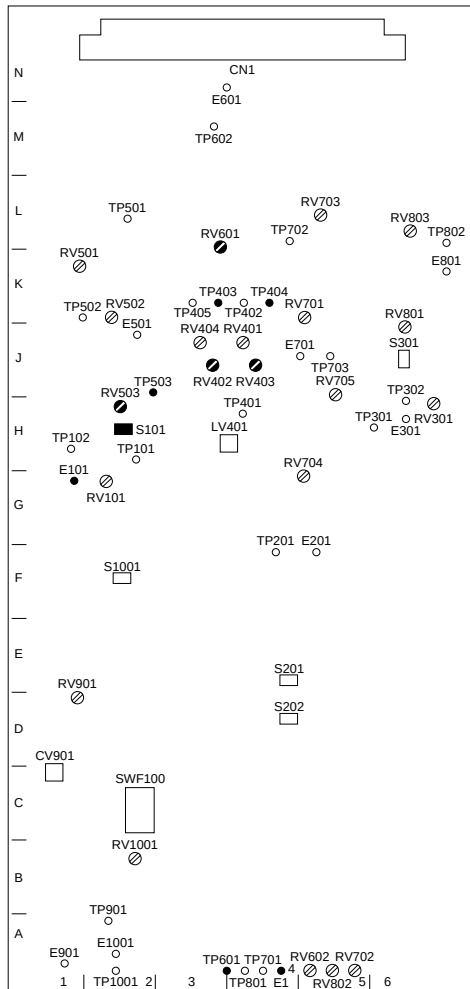
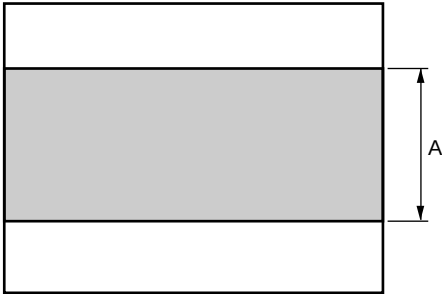
Equipment: Oscilloscope
(20 MHz BW Limit:OFF)

To be extended: DM-110 board

Test point: TP503 (GND: E101)/DM-110 board

Adjustment point: ⚙RV503 (Y CAR LEV)/
DM-110 board

Specifications: $A = 400 \pm 10 \text{ mV p-p}$



DM-110 BOARD (A SIDE)

3-4-8. Y DEMOD Carrier Balance Adjustment

Rank: B

Equipment: Oscilloscope

To be extended: DM-110 board

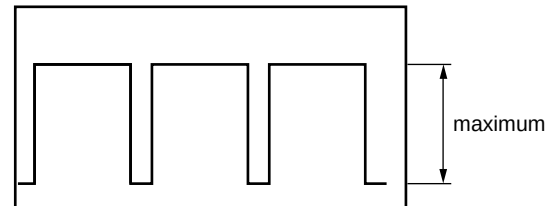
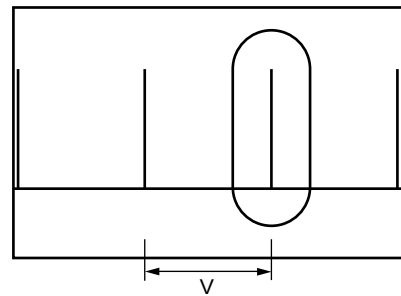
Preparations:

- CLOSE button/MSU-700 → “ON”
- S101 (Y 2nd AGC)/DM-110 board → “OFF”

Test point: TP601 (GND: E1)/DM-110 board

Adjustment point: ⚙RV601 (Y CAR BAL)/
DM-110 board

Specifications: Sample pulse waveform level shall be maximum.

**Setting after adjustment**

- S101 (Y 2nd AGC)/DM-110 board → “ON”

3-4-9. Y OFFSET Adjustment

Rank: A

Note: Confirm that 45 MHz frequency on the MD-103 board (CA-550/550P) is correct.

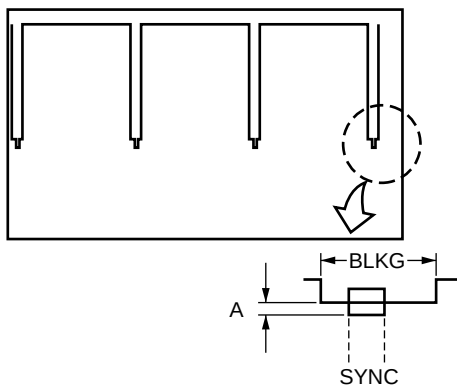
Equipment: Oscilloscope

To be extended: DM-110 board

Test point: TP601 (GND: E1)/DM-110 board

Adjustment point: ⦿RV501 (Y OFFSET ADJ)/
DM-110 board

Specifications: $A = 0 \pm 3 \text{ mV}$



3-4-10. Y 1st AGC Adjustment

Rank: B

Equipment: Oscilloscope

To be extended: DM-110 board

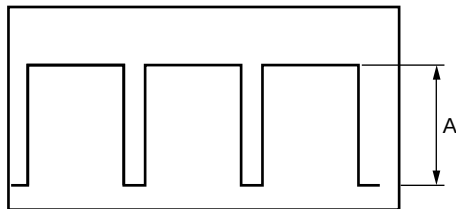
Preparations:

- S201 (AUTO/MANU)/DM-110 board → “AUTO”
- S101 (Y 2nd AGC)/DM-110 board → “OFF”

Test point: TP601 (GND: E1)/DM-110 board

Adjustment point: ⦿RV101 (Y AGC CONT)/
DM-110 board

Specifications: $A = 700 \pm 20 \text{ mV}$



Setting after Adjustment:

- S101 (Y 2nd AGC)/DM-110 board → “ON”

3-5. CHROMA Cable Compensation System Adjustment

Rank: B

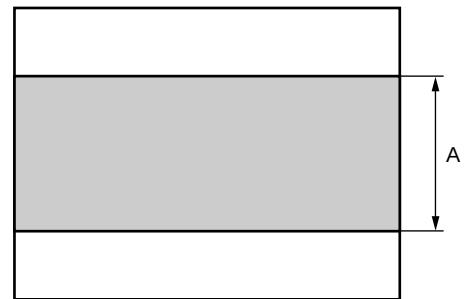
Equipment: Oscilloscope
(20 MHz BW Limit:OFF)

To be extended: DM-110 board

Test point: TP703 (GND: E301)/DM-110 board

- Adjustment point:** RV705 (C CAR LEV)/
DM-110 board

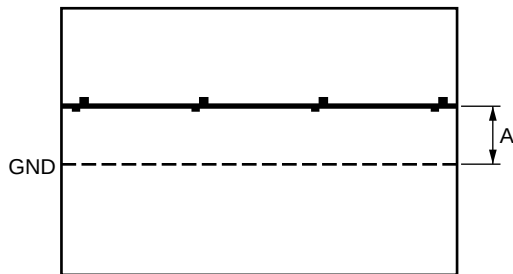
Specifications: $A = 400 \pm 10 \text{ mV p-p}$

[illegible]

3-5-2. C PLL Set Adjustment

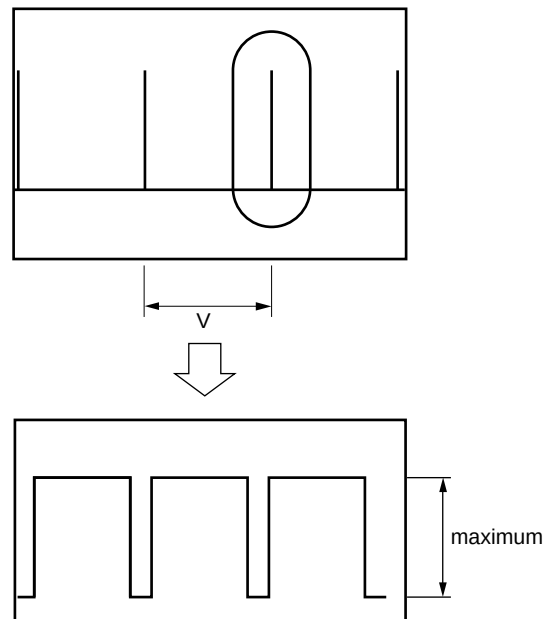
Rank: C
Note: Confirm that 45 MHz frequency on the MD-103 board (CA-550/550P) is correct.

Equipment: Oscilloscope
To be extended: DM-110 board
Test point: TP702 (GND: E301)/DM-110 board
Adjustment point: ⚙RV704 (PLL SET)/DM-110 board
Specifications: $A = 0 \pm 30 \text{ mV dc}$



3-5-3. B-Y DEMOD Carrier Balance Adjustment

Rank: B
Equipment: Oscilloscope
To be extended: DM-110 board
Preparations:
 • S301 (C 2nd AGC)/DM-110 board → “OFF”
 • CLOSE button/MSU-700 → “ON”
Test point: TP701 (GND: E1)/DM-110 board
Adjustment point: ⚙RV701 (B-Y CAR BAL)/DM-110 board
Specifications: Sample pulse waveform level shall be maximum.



Setting after Adjustment:
 • S301 (C 2nd AGC)/DM-110 board → “ON”

3-5-4. B-Y Crosstalk Adjustment

Rank: A

Note: Confirm that 45 MHz frequency on the MD-103 board (CA-550/550P) is correct.

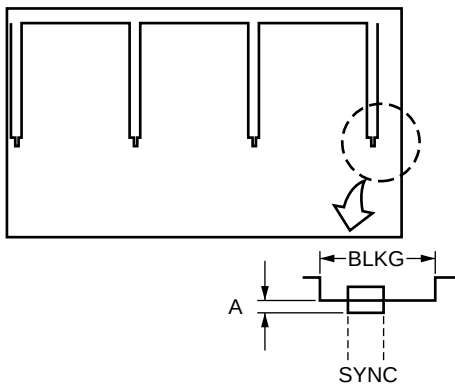
Equipment: Oscilloscope

To be extended: DM-110 board

Test point: TP701 (GND: E1)/DM-110 board

Adjustment point: RV703 (OFFSET ADJ)/
DM-110 board

Specifications: $A = 0 \pm 3 \text{ mV}$



3-5-5. C 1st AGC Adjustment

Rank: B

Equipment: Oscilloscope

To be extended: DM-110 board

Preparations:

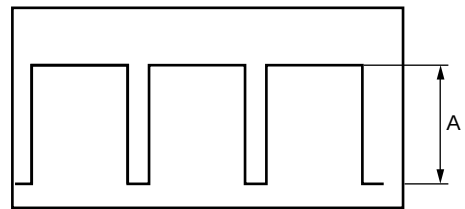
• S201 (AUTO/MANU)/DM-110 board → “AUTO”

• S301 (C 2nd AGC)/DM-110 board → “OFF”

Test point: TP701 (GND: E1)/DM-110 board

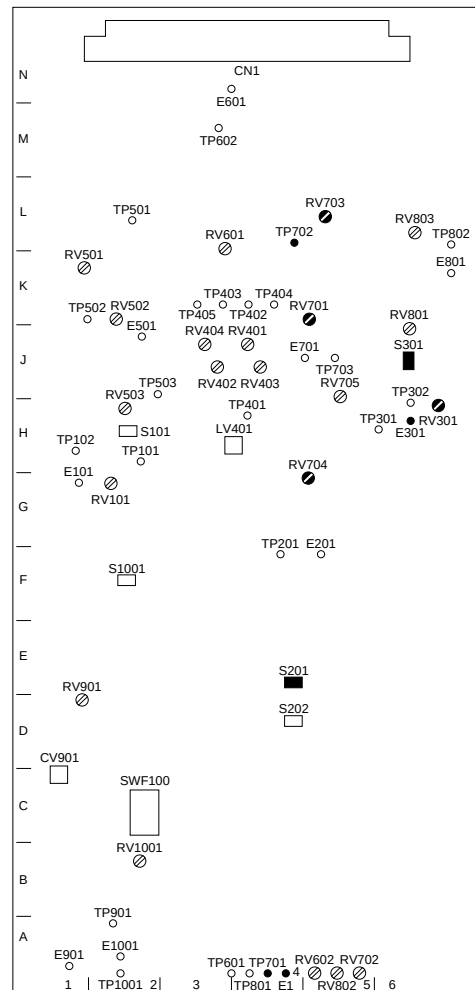
Adjustment point: RV301 (C AGC CONT)/
DM-110 board

Specifications: $A = 350 \pm 10 \text{ mV}$



Setting after Adjustment:

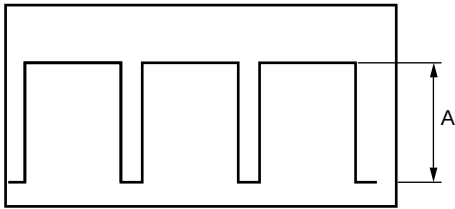
• S301 (C 2nd AGC)/DM-110 board → “ON”



DM-110 BOARD (A SIDE)

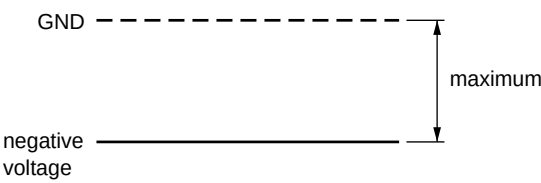
3-5-6. B-Y OUT Level Adjustment

Rank: A
Equipment: Oscilloscope
To be extended: DM-110 board
Preparation:
• S301 (C 2nd AGC)/DM-110 board → “ON”
Test point: TP701 (GND: E1)/DM-110 board
Adjustment point: ⚙RV702 (B-Y LEVEL)/DM-110 board
Specifications: A = 350 ±5 mV p-p



3-5-7. R-Y DEMOD Carrier Balance Adjustment

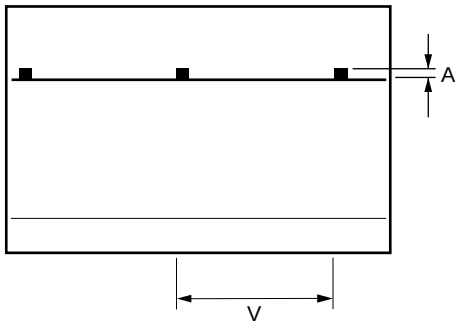
Rank: B
Equipment: Oscilloscope
To be extended: DM-110 board
Test point: TP802 (GND: E301)/DM-110 board
Adjustment point: ⚙RV801 (R-Y CAR BAL)/DM-110 board
Specifications: The negative absolute value of DC level shall be maximum.



3-5-8. R-Y Crosstalk Adjustment

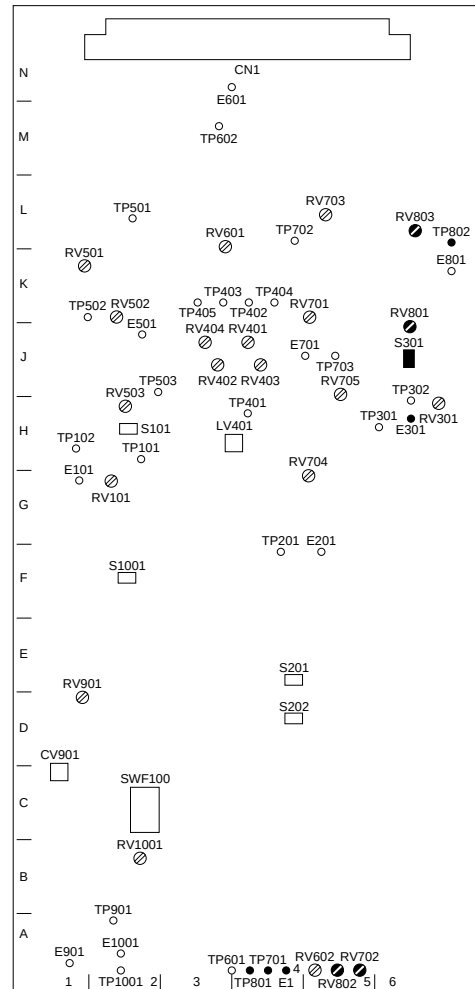
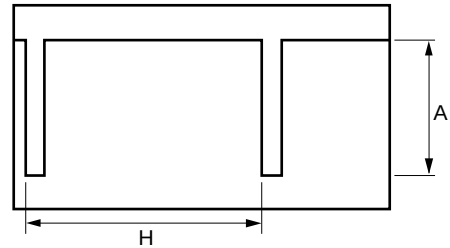
Rank: A
Note: Confirm that 45 MHz frequency on the MD-103 board (CA-550/550P) is correct.

Equipment: Oscilloscope
To be extended: DM-110 board
Test point: TP801 (GND: E1)/DM-110 board
Adjustment point: RV803 (90 ° SET)/DM-110 board
Specifications: Sample pulse crosstalk level shall be minimum.
 $A = 0 \pm 3 \text{ mV}$



3-5-9. R-Y OUT Level Adjustment

Rank: A
Equipment: Oscilloscope
To be extended: DM-110 board
Preparation:
 • S301 (C 2nd AGC)/DM-110 board → “ON”
Test point: TP801 (GND: E1)/DM-110 board
Adjustment point: RV802 (R-Y LEVEL)/DM-110 board
Specifications: $A = 350 \pm 5 \text{ mV}$

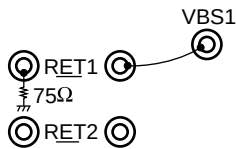


DM-110 BOARD (A SIDE)

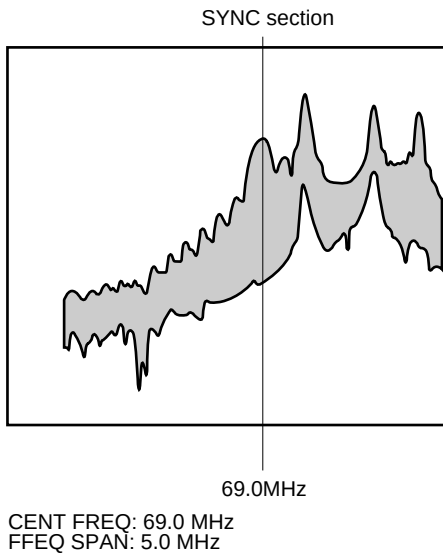
3-6. RETURN VIDEO Modulation System Adjustment

3-6-1. Return Video Carrier Frequency Adjustment

- Rank:** B
- Equipment:** Spectrum analyzer
- To be extended:** DM-110 board
- Preparations:**
- BARS button/MSU-700 → “OFF”
 - TEST 2 button/MSU-700 → “ON”
 - Check to see that the following test signal is output from the VBS 1 OUT connector/CCU rear panel.
100 ± 1 IRE (for NTSC)
700 ± 7 mV (for PAL)
 - Connect the VBS 1 OUT connector and RET 1 IN connector/CCU rear panel with a BNC cable.

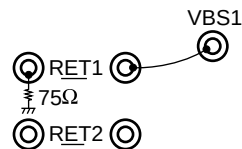


- Test point:** TP901 (GND: E901)/DM-110 board
- Adjustment point:** ⚙CV901 (RET FREQ)/DM-110 board
- Specifications:** 69.000 ± 0.005 MHz



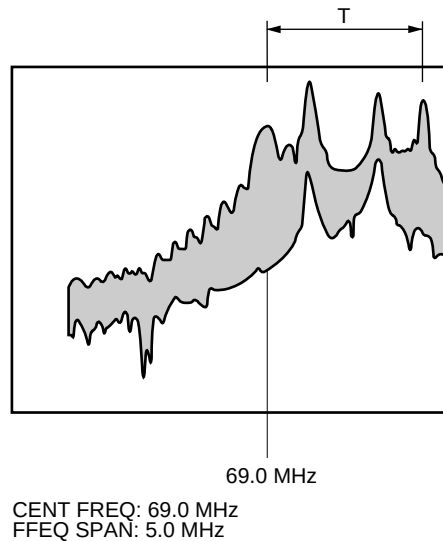
3-6-2. Return Video Deviation Adjustment

- Rank:** B
- Equipment:** Spectrum analyzer
- To be extended:** DM-110 board
- Preparations:**
- BARS button/MSU-700 → “OFF”
 - TEST 2 button/MSU-700 → “ON”
 - Check to see that the following test signal is output from the VBS 1 OUT connector/CCU rear panel.
100 ± 1 IRE (for NTSC)
700 ± 7 mV (for PAL)
 - Connect the VBS 1 OUT connector and RET 1 IN connector/CCU rear panel with a BNC cable.



- Test point:** TP901 (GND: E901)/DM-110 board
- Adjustment point:** ⚙RV901 (RET DEV)/DM-110 board

- Specifications:** T = 2.000 ± 0.005 MHz



3-7. PROMPT VIDEO Modulation System Adjustment

3-7-1. PROMPT VIDEO Modulation Adjustment

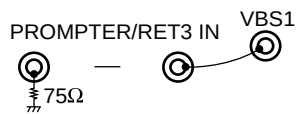
Rank: B

Equipment: Oscilloscope, Video signal generator

To be extended: DM-110 board

Preparations:

- S1001 (PROMPT SELECT RET3/PROMPT)/
DM-110 board → “PROMPT”
- S201 (MODE AUTO/MANU)/DM-110 board → “MANU”
- S202 (CABLE LENGTH)/DM-110 board → “2”
- BARS button/MSU-700 → “OFF”
- TEST 2 button/MSU-700 → “ON”
- Check to see that the following test signal is output from the VBS 1 OUT connector/CCU rear panel.
100 ± 1 IRE (for NTSC)
700 ± 7 mV (for PAL)
- Connect the VBS 1 OUT connector and PROMPTER/RET 3 IN connector/CCU rear panel with a BNC cable.



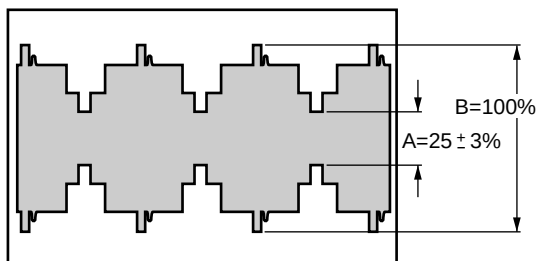
Test point: TP1001 (GND: E1001)/
DM-110 board

Adjustment point: RV1001 (PROMPT DEV)/
DM-110 board

Specifications: A = 25 ± 3 %

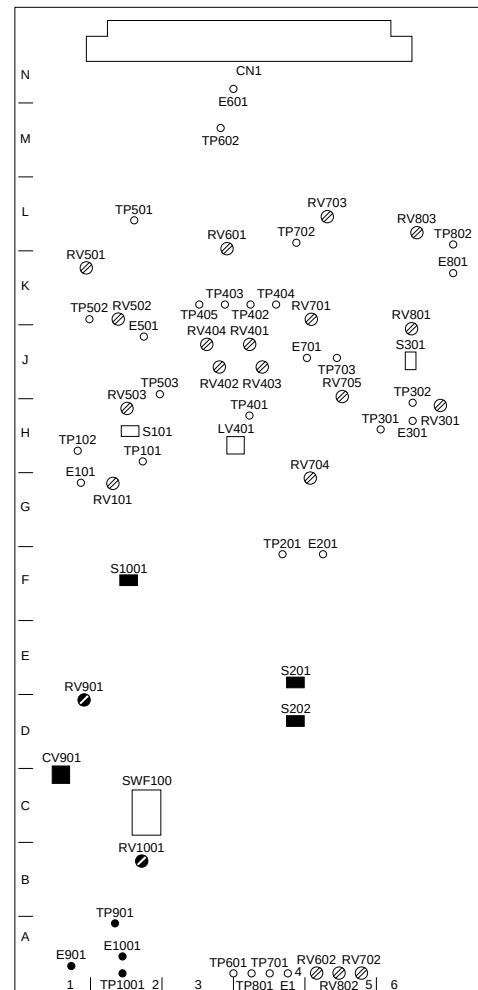
Adjustment Procedures:

- Adjust RV1001 so that the level “A” is 25 ± 3% when the level “B” is 100% with using VAR control of the oscilloscope.



Setting after Adjustment:

- S201 (MODE AUTO/MANU)/
DM-110 board → “AUTO”
- S202 (CABLE LENGTH)/DM-110 board → “1”



DM-110 BOARD (A SIDE)

3-8. TRIAX Interface System Adjustment

3-8-1. Frequency Set Adjustment

Rank: C

Note: Check to see that no signal is input to the INCOM connector and PGM connector on the CCU rear panel or the front panel.

Perform the adjustment only when replacing the following part.

●LV1, 21, 41, 61,
D2, 22, 42, 62

Equipment: Frequency counter, Digital voltmeter

To be extended: AU-231 board

Adjustment Procedures:

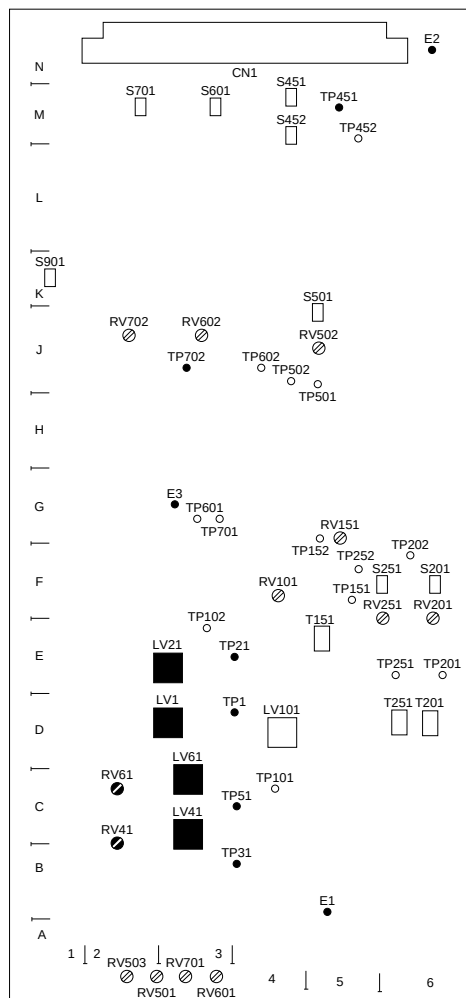
1. Disconnect the VA-175 and AT-111 boards.
2. Turn on the power.

AU-231 board (GND: E1)

	Test point	Adj. point	Specifications
PGM	TP51	●LV61	4.300 ± 0.005 MHz
INCOM 1	TP31	●LV41	3.600 ± 0.005 MHz
H CONT	TP1	●LV1	2.500 ± 0.005 MHz
CCU DATA	TP21	●LV21	3.000 ± 0.005 MHz

Setting after Adjustment:

Return the VA-175 and AT-111 boards to their normal position.



AU-231 BOARD (A SIDE)

3-8-2. INCOM Deviation Adjustment

Rank: C

Equipment: Spectrum analyzer, Oscilloscope, Audio generator

To be extended: AU-231 board

Preparations:

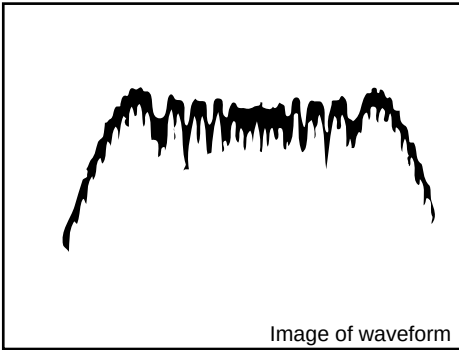
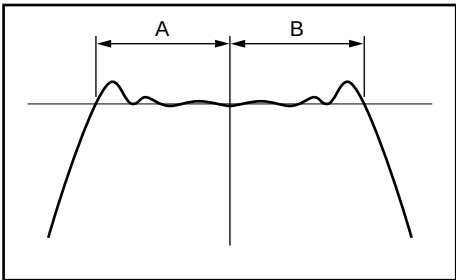
- INCOM 1 (PROD/ENG) switch/ Camera rear panel → “ENG”

1. (For 4W intercom system)
Feed the 400Hz sine wave signal from the audio generator to pin 66 (X), pin 65 (Y) and pin 67 (GND)/extension board (extending AU-231).
• Fig-2 (Refer to 3-1-4. Audio connection.)
(For 2W intercom system)
Feed the 400Hz sine wave signal from the audio generator to pin 66 (X), pin 67 (GND)/extension board (extending AU-231).
• Fig-1 (Refer to 3-1-4. Audio connection.)
2. Adjust the output of audio generator so that the level at TP702 (GND: E3)/AU-231 board is 200 mV p-p.

Test point: TP31 (GND: E1)/AU-231 board

Adjustment point: ⚙RV41 (INCOM 1 DEV)/AU-231 board

Specifications: A = B = 6.0 ± 0.4 kHz



CENT FREQ : 3.9 MHz
FREQ SPAN : 20 MHz

3-8-3. PGM Deviation Adjustment

Rank: C

Equipment: Spectrum analyzer, Oscilloscope, Audio generator

To be extended: AU-231 board

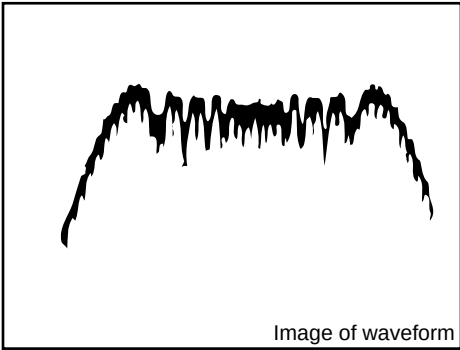
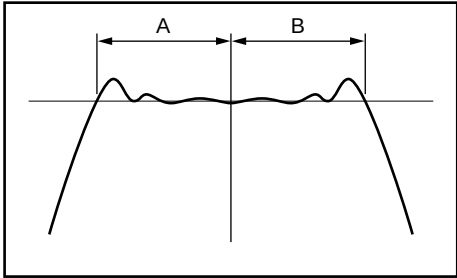
Test point: TP51 (GND: E2)/AU-231 board

Preparations:

1. Feed the 400 Hz sine wave to pin 57 (X), pin 56 (Y) and pin 55 (GND)/extension board (extending AU-231).
• Fig-2 (Refer to 3-1-4. Audio connection.)
2. Adjust the output of audio generator so that the level at TP451 (GND: E2)/AU-231 board is 200 mV p-p.

Adjustment point: ⚙RV61 (PGM DEV)/AU-231 board

Specifications: A = B = 7.0 ± 0.4 kHz



CENT FREQ : 4.3 MHz
FREQ SPAN : 20 MHz

3-8-4. INCOM Demodulation Adjustment

Rank: C

Note: Perform the adjustment only when replacing ⦿T401/AU-231 board.

Equipment: Oscilloscope, Audio generator

To be extended: AU-231 board

Preparations:

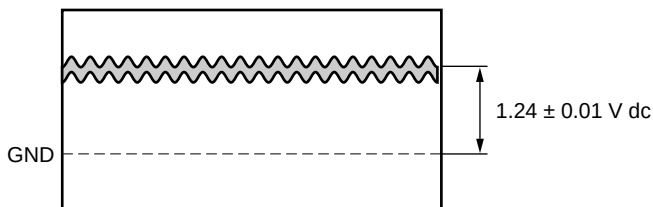
- Feed the 1 kHz, 220 mVp-p sine wave signal from the audio generator to the INCOM connector on the CA-550/550P.

• Fig-1 (Refer to 3-1-4. Audio connection.)

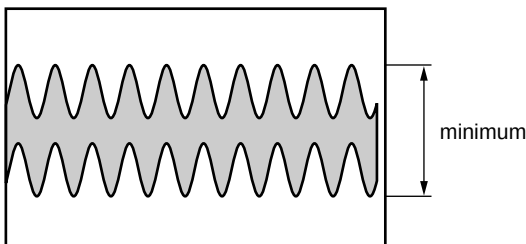
Test point: TP151 (GND: E1)/AU-231 board

Adjustment Procedures:

- Adjust the white core of ⦿T151/AU-231 board slowly so that the DC level at TP151 (GND: E1) is 1.24 ± 0.02 V dc.



- Set the input range of oscilloscope to AC mode, and adjust the blue core of ⦿T151/AU-231 board so that the sine wave is minimum.



- Repeat procedure 1.

3-8-5. INCOM Level Adjustment

Rank: B

Equipment: Oscilloscope, Audio generator

To be extended: AU-231 board

Preparation:

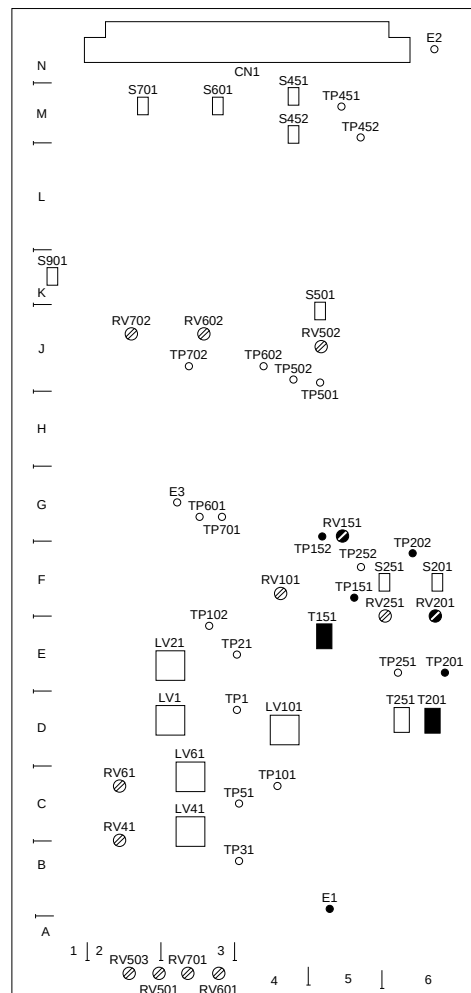
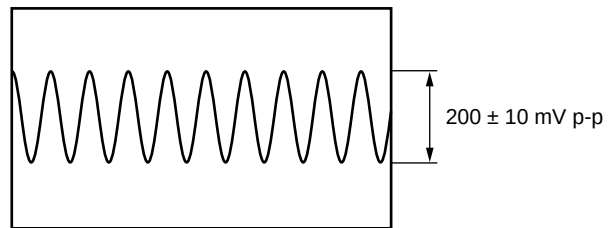
- Feed the 1 kHz, 220 mVp-p sine wave signal from the audio generator to the INCOM connector on the CA-550/550P.

• Fig-1 (Refer to 3-1-4. Audio connection.)

Test point: TP152 (GND: E1)/AU-231 board

Adjustment point: ⦿RV151 (INCOM 1 LEVEL)/AU-231 board

Specifications: $A = 200 \pm 10$ mV p-p



AU-231 BOARD (A SIDE)

3-8-6. MIC 1 Demodulation Adjustment

Rank: C

Note: Perform the adjustment only when replacing ⦿T201/AU-231 board.

Equipment: Oscilloscope, Audio generator

To be extended: AU-231 board

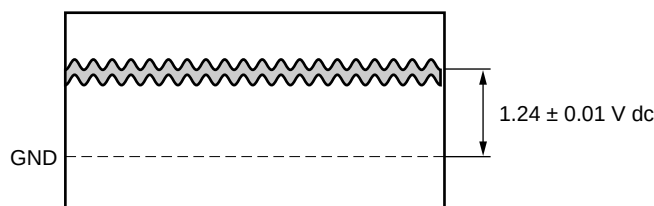
Preparations:

- S101 (MIC 1 GAIN) switch/AT-111 board → “MIN”
- Feed the 1 kHz, 2.2 mVp-p (−60 dBu) sine wave signal from the audio generator to the MIC connector on the BVP-550/550P.
- Fig-3 (Refer to 3-1-4. Audio connection.)

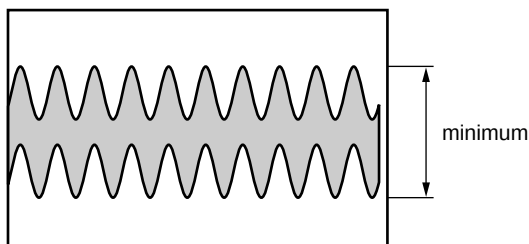
Test point: TP201 (GND: E1)/AU-231 board

Adjustment Procedures:

1. Adjust the white core of ⦿T201/AU-231 board slowly so that the DC level at TP201 (GND: E1) is 1.24 ± 0.01 V dc.



2. Set the input range of oscilloscope to AC mode, and adjust the blue core of ⦿T201/AU-231 board so that the sine wave is minimum.



3. Repeat procedure 1.

3-8-7. MIC 1 Level Adjustment

Rank: B

Equipment: Oscilloscope, Audio generator

To be extended: AU-231 board

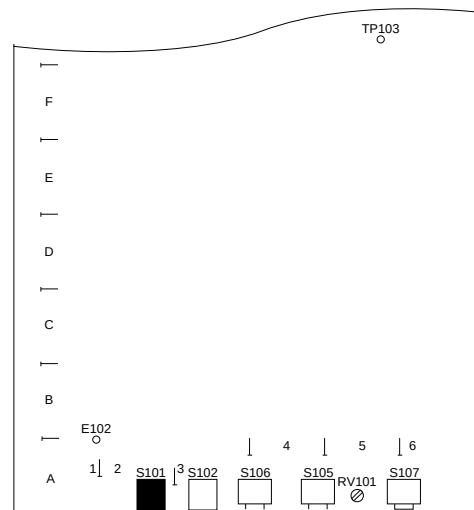
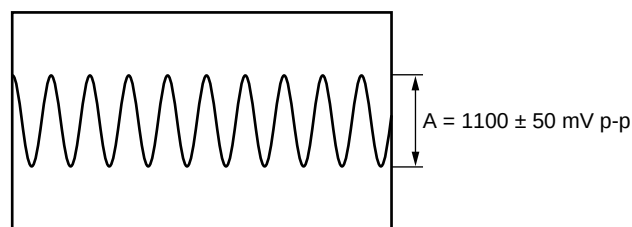
Preparations:

- S101 (MIC 1 GAIN) switch/AT-111 board → “MIN”
- Feed the 1 kHz, 2.2 mVp-p (−60 dBu) sine wave signal from the audio generator to the MIC connector on the BVP-550/550P.
- Fig-3 (Refer to 3-1-4. Audio connection.)

Test point: TP202 (GND: E1)/AU-231 board

Adjustment point: $\text{⦿RV201 (MIC 1 LEVEL)}/$
AU-231 board

Specifications: A = 1100 ± 50 mV p-p



AT-111 BOARD (A SIDE)

3-8-8. MIC 2 Demodulation Adjustment

Rank: C

Note: Perform the adjustment only when replacing ②T251/AU-231 board.

Equipment: Oscilloscope, Audio generator

To be extended: AU-231 board

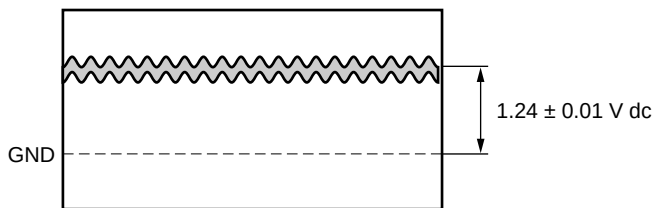
Preparations:

- S102 (MIC 2 GAIN) switch/AT-111 board « +MIN+
- Feed the 1 kHz, 2.2 mVp-p (−60 dBu) sine wave signal from the audio generator to the MIC IN connector on the CA-550/550P.
- Fig-3 (Refer to 3-1-4. Audio connection.)

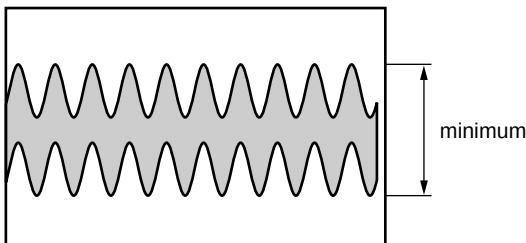
Test point: TP251 (GND: E1)/AU-231 board

Adjustment Procedures:

1. Adjust the white core of ②T251/AU-231 board slowly so that the DC level at TP251 (GND: E1) /AU-231 board is 1.24 ± 0.01 V dc.



- Set the input range of oscilloscope to AC mode, and adjust the blue core of T251/AU-231 board so that the sine wave is minimum.



3. Repeat procedure 1.

3-8-9. MIC 2 Level Adjustment

Rank: B

Equipment: Oscilloscope, Audio generator

To be extended: AU-231 board

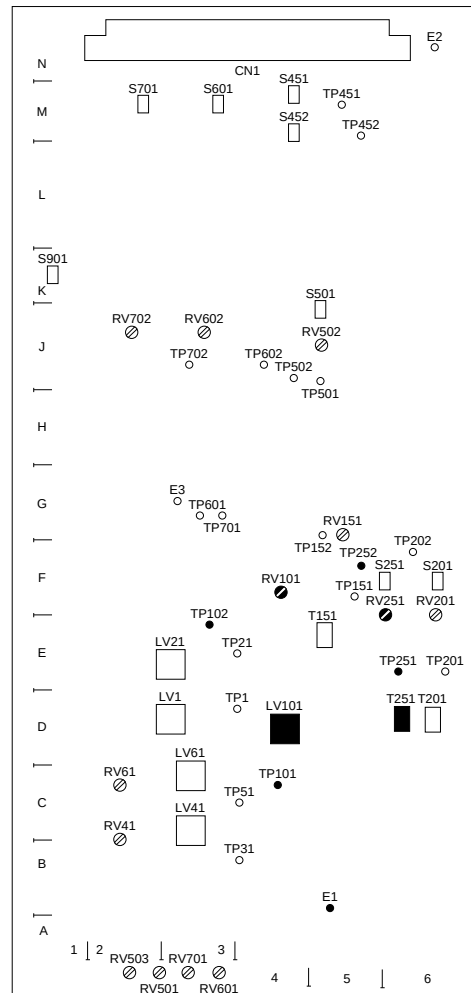
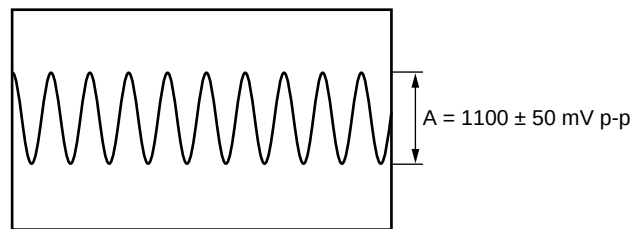
Preparations:

- S102 (MIC 2 GAIN) switch/AT-111 board → “MIN”
- Feed the 1kHz, 2.2 mVp-p (−60 dBu) sine wave signal from the audio generator to the MIC IN connector on the CA-550/550P.
- Fig-3 (Refer to 3-1-4. Audio connection.)

Test point: TP252 (GND: E1)/AU-231 board

Adjustment point: ●RV251 (MIC 2 LEVEL)/
AU-231 board

Specifications: $A = 1100 \pm 50 \text{ mV p-p}$



AU-231 BOARD (A SIDE)

CCU-550/550P

3-8-10. CHU DATA Demodulation Adjustment

Rank: C

Notes:

- The adjustment for BVP-550/550P shall be completed before this adjustment.
- Perform the adjustment only when replacing ⚙LV101 (5.6 MHz TUNE)/AU-231 board.

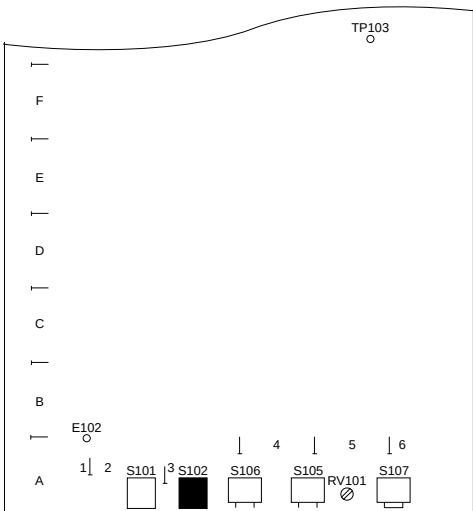
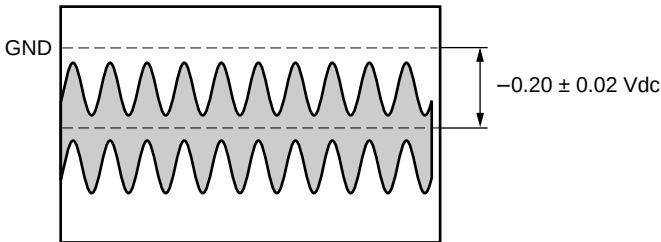
Equipment: Oscilloscope
(20 MHz BW Limit:ON)

To be extended: AU-231 board

Test point: TP101 (GND: E1)/AU-231 board

Adjustment point: ⚙LV101 (5.6 MHz TUNE)/
AU-231 board

Specifications: -0.20 ± 0.02 V dc



AT-111 BOARD (A SIDE)

3-8-11. CHU TONE Adjustment

Rank: C

Equipment: Oscilloscope (DC mode)

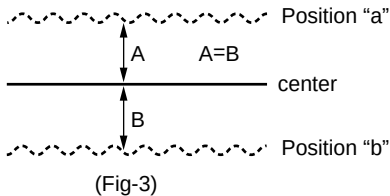
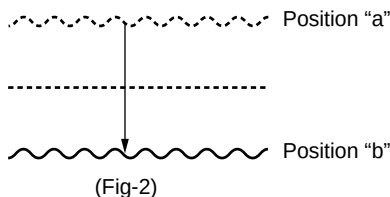
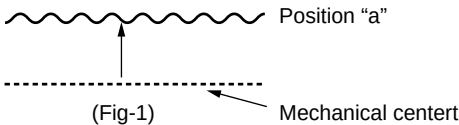
To be extended: AU-231 board

Test point: TP102 (GND: E1)/AU-231 board

Adjustment point: ⚙RV101 (TONE TUNE)/
AU-231 board

Adjustment Procedures:

1. ⚙RV101 (TONE TUNE)/
AU-231 board → Mechanical center
2. Turn 1RV101 (TONE TUNE)/AU-231 board slowly clockwise ↻ and stop it at the point where the sine wave just appears.
Measure the DC voltage "a"...Fig-1
3. Turn ⚙RV101 (TONE TUNE)/AU-231 board slowly counterclockwise ↻ and stop it at the point where the sine wave just appears.
Measure the DC voltage "b"...Fig-2
4. Adjust the DC level with ⚙RV101 (TONE TUNE)/
AU-231 board so that A is equal to B...Fig-3



3-9. Intercom System Adjustment

3-9-1. INCOM (T) Level Set Adjustment

Rank: C

Equipment: Oscilloscope, Audio generator

Preparations:

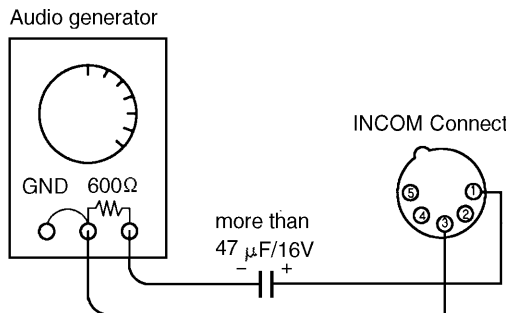
- S4/AU-236 board → “CM”
- MIC switch/CCU front panel → “MIC ON”

Test point: TP501 (GND: E2)/AU-231 board

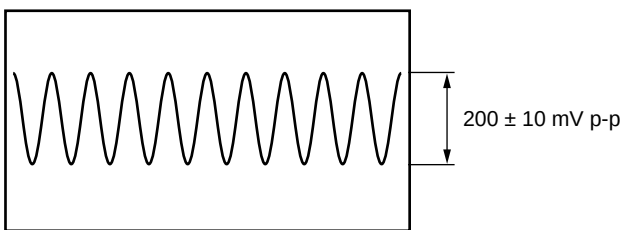
Adjustment point: ⚙RV502 (FRONT MIC GAIN)/
AU-231 board

Adjustment Procedures:

1. Connect the audio generator and INCOM connector/CCU front panel as follows.



2. Feed the 1 kHz, 220 mV p-p sine wave from the audio generator.
3. Adjust ⚙RV502 (FRONT MIC GAIN)/AU-231 board so that the video level at TP501 is 200 ± 10 mV p-p.



3-9-2. SIDE TONE Adjustment

Rank: C

Equipment: Oscilloscope, Audio generator

To be extended: AU-231 board

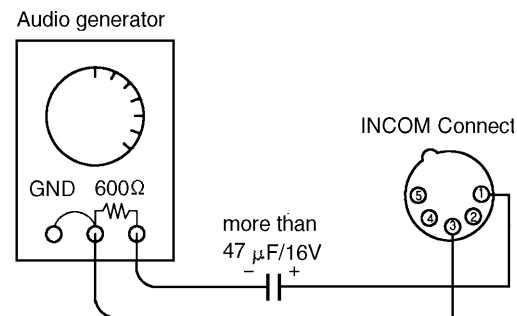
Preparations:

- S4/AU-236 board → “CM”
- MIC switch/CCU front panel → “MIC ON”

Test point: TP502 (GND: E2)/AU-231 board

Adjustment Procedures:

1. Connect the audio generator and INCOM connector/CCU front panel as follows.



2. Adjust the output level of the audio generator so that the 1 kHz 200 mVp-p sine wave at TP501 (GND: E1)/AU-231 board is output.
3. Adjust ⚙RV501 (SIDE TONE)/AU-231 board so that the level at TP502 (GND: E2)/AU-231 board is 20 ± 4 mV p-p.

Note

This specifications are for guidance when maintenance.

When intercom system is practically used, adjust the side tone level to the customer's preference.

3-9-3. FP PGM Level Adjustment

Rank: C

Equipment: Spectrum analyzer, Oscilloscope,
Audio generator

To be extended: AU-231 board

Preparation:

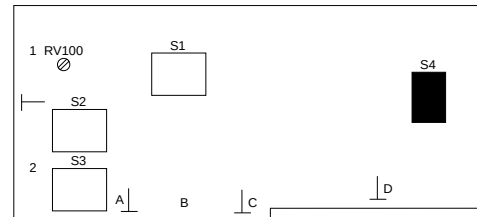
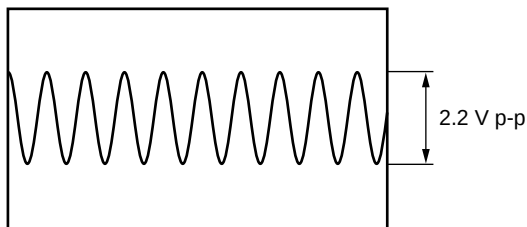
- INCOM switch/CCU front panel → “ENG”

Test point: pin 37 (GND: pin 40)/
extension board (extending AU-231)

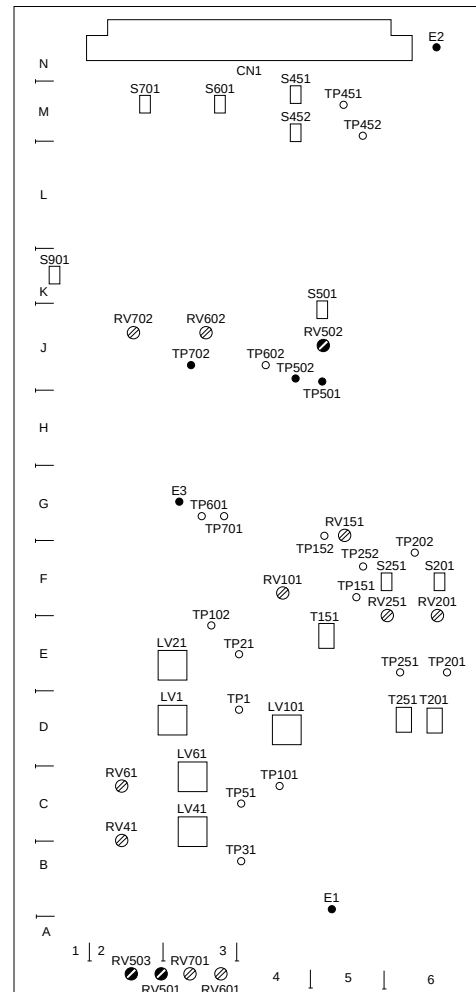
Adjustment point: ●RV503 (PGM LEVEL)/
AU-231 board

Adjustment Procedures:

1. (For 4W intercom system)
Feed the 400Hz sine wave signal from the audio generator to pin 66 (X), pin 65 (Y) and pin 67 (GND)/extension board (extending AU-231).
•Fig-2 (Refer to 3-1-4. Audio connection.)
(For 2W intercom system)
Feed the 400 Hz sine wave signal from the audio generator to pin 66 (X), pin 67 (GND)/extension board (extending AU-231).
•Fig-1 (Refer to 3-1-4. Audio connection.)
2. Adjust the output of audio generator so that the level at TP702 (GND: E3)/AU-231 board is 200 mV p-p.
3. Adjust the INCOM control/CCU front panel so that the signal level at pin 37(GND:40)/extension board is 2.2 V p-p.
4. Feed the 400 Hz sine wave signal from the audio generator to pin 57 (X), pin 56 (Y) and pin 55 (GND)/extension board (extending AU-231).
•Fig-2 (Refer to 3-1-4. Audio connection.)
5. Adjust the output of audio generator so that the level at TP451 (GND: E1)/AU-231 board is 200 mV p-p.
6. INCOM switch/CCU front panel → “PGM”
7. Adjust ●RV503 (PGM LEVEL)/AU-231 board so that the signal level at pin 37(GND: pin 40)/extension board is 2.2 Vp-p.



AU-236 BOARD (A SIDE)



AU-231 BOARD (A SIDE)

3-10. RTS Intercom System Adjustment

3-10-1. ENG RTS CANCEL Adjustment

Note

- This adjustment is necessary when the RTS intercom system is used.

Rank: C

Equipment: Oscilloscope, Audio generator

To be extended: AU-231 board

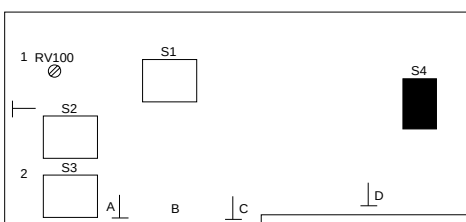
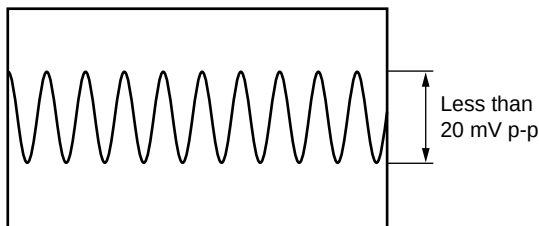
Preparations:

- S4/AU-236 board → “CM”
- MIC switch/CCU front panel → “MIC ON”
- INCOM (PROD/PRIV/ENG) switch/
AU-231 board panel → “ENG”
- S701 (INCOM SELECT)/AU-231 board → “RTS”
- Connect between pin 69 and pin 67/extension board with a 200 Ω resistor.
- Feed the 1 kHz, 220 mVp-p sine wave to INCOM connector/CCU front panel.

Test point: TP602 (GND: E3)/AU-231 board

Adjustment point: RV601 (ENG RTS CANCEL)/
AU-231 board

Specifications: Level A shall be less than 20 mVp-p and minimum.



AU-236 BOARD (A SIDE)

3-10-2. PROD RTS CANCEL Adjustment

Note

- This adjustment is necessary when the RTS intercom system is used.

Rank: C

Equipment: Oscilloscope, Audio generator

To be extended: AU-231 board

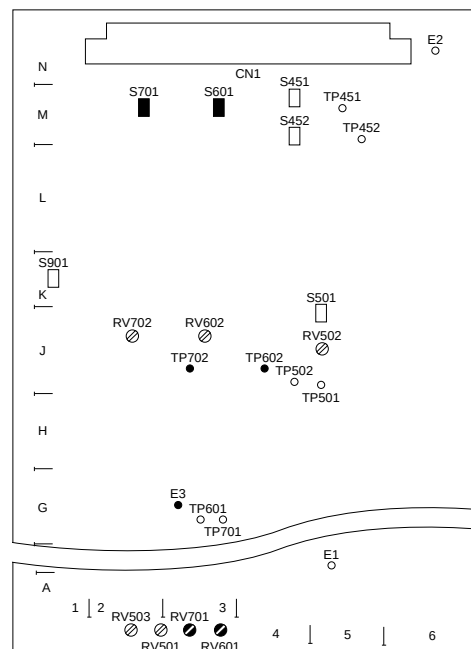
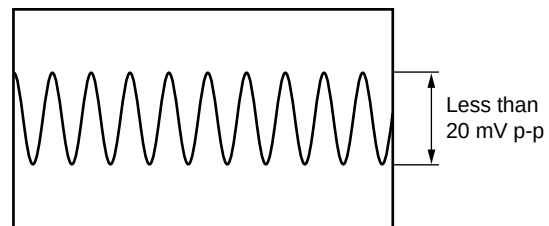
Preparations:

- S4/AU-236 board → “CM”
- MIC switch/CCU front panel → “MIC ON”
- INCOM (PROD/PRIV/ENG) switch/
AU-231 board panel → “PROD”
- S601 (INCOM SELECT)/AU-231 board → “RTS”
- Connect pin 63 and pin 61/extension board with a 200 Ω resistor.
- Feed the 1 kHz, 220 mVp-p sine wave to INCOM connector/CCU front panel.

Test point: TP702 (GND: E3)/AU-231 board

Adjustment point: RV701 (PROD RTS CANCEL)/
AU-231 board

Specifications: Level A shall be less than 20 mVp-p and minimum.



AU-231 BOARD (A SIDE)

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SAFETY CHECK-OUT

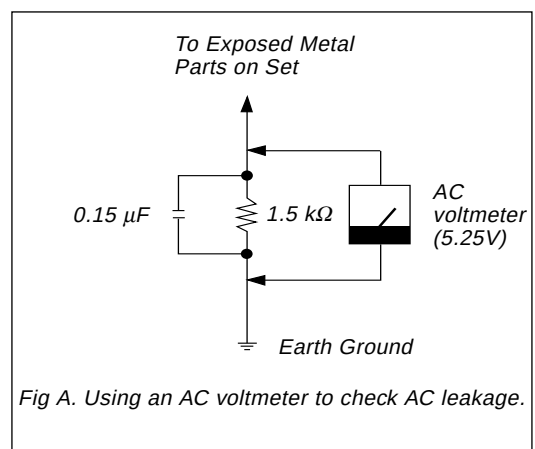
After correcting the original service problem, perform the following safety checks before releasing the set to the customer :

Check the metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 3.5 mA. Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 5.25 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 20 V AC range are suitable. (See Fig. A)



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CCU-550P (CE) E
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